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RESOURCE CONSERVATION AND RECOVERY ACT FACILITY INVESTIGATION REPORT
ADDENDUM IM COMPLETION REPORT SOLID WASTE MANAGEMENT UNIT 36 (SWMU 36)
AREA OF CONCERN 620 (AOC 620) ZONE F CNC CHARLESTON SC
2/25/2003
CH2M HILL

RFI REPORT ADDENDUM

RFI Report Addendum and IM Completion Report SWMU 36/AOC 620, Zone F



***Charleston Naval Complex
North Charleston, South Carolina***

SUBMITTED TO
***U.S. Navy Southern Division
Naval Facilities Engineering Command***

CH2M Jones

February 2003

*Revision No. 0
Contract N62467-99-C-0960*



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February 25, 2003

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Bureau of Land and Waste Management
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Re: RFI Report Addendum and IM Completion Report (Revision 0) – SWMU 36/AOC
620, Zone F

Dear Mr. Scaturo:

Enclosed please find four copies of the RFI Report Addendum and IM Completion Report (Revision 0) for SWMU 36/AOC 620 in Zone F of the Charleston Naval Complex (CNC). This report has been prepared pursuant to agreements by the CNC BRAC Cleanup Team for completing the RCRA Corrective Action process.

The principal author of this document is Louise Palmer. Please contact her at 704/329-0073, extension 296, if you have any questions or comments.

Sincerely,

CH2M HILL

Dean Williamson, P.E.

cc: Dann Spariosu/USEPA, w/att
Rob Harrell/Navy, w/att
Gary Foster/CH2M HILL, w/att

CH2MHILL TRANSMITTAL

To: Mr. Jerry Stamps
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From: Sara Vivas
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Date: March 5, 2003

Re: Replacement Pages 1-1 and 8-1 for the *RFI Report Addendum and IM Completion Report, SWMU 36/AOC 620, Zone F, Revision 0* (originally submitted February 26, 2003)

Quantity	Description
4	Sets of replacement pages 1-1 and 8-1, (corresponding to Sections 1.0 and 8.0, respectively) for the <i>RFI Report Addendum and IM Completion Report, SWMU 36/AOC 620, Zone F, Revision 0</i> (originally submitted February 26, 2003).

If material received is not as listed, please notify us at once

Enclosure

Enclosed please find 4 sets of replacement pages for the *Revision 0 document, RFI Report Addendum and IM Completion Report, SWMU 36/AOC 620, Zone F*, originally submitted to SCDHEC on February 26, 2003. These pages are to be replaced within the Revision 0 submittal (as agreed upon during 03/03/03 teleconference between Dean Williamson, CH2M-Jones and Jerry Stamps, SCDHEC).

Copy To:

Dann Spariosu/USEPA, w/att
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RFI REPORT ADDENDUM

RFI Report Addendum and IM Completion Report SWMU 36/AOC 620, Zone F



***Charleston Naval Complex
North Charleston, South Carolina***

SUBMITTED TO
***U.S. Navy Southern Division
Naval Facilities Engineering Command***

PREPARED BY
CH2M-Jones

February 2003

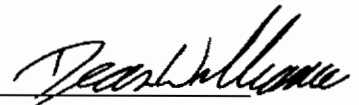
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Certification Page for RFI Report Addendum and IM Completion Report (Revision 0) – SWMU 36/ AOC 620, Zone F

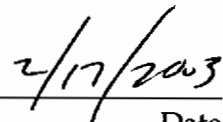
I, Dean Williamson, certify that this report has been prepared under my direct supervision. The data and information are, to the best of my knowledge, accurate and correct, and the report has been prepared in accordance with current standards of practice for engineering.

South Carolina

Permit No. 21428



Dean Williamson, P.E.



Date

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- C** Well Construction Log for F620GW005
- D** Analytical Data Summaries for Sampling Performed Subsequent to the *Zone F RFI Report, Revision 0*
- E** Data Validation Reports for Sampling Performed Subsequent to the *Zone F RFI Report, Revision 0*
- F** Copy of the *Phase II Interim Measure Work Plan, SWMU 36/AOC 620, Zone F, Revision 0* (CH2M-Jones, 2001e)
- G** UCL₉₅ calculations for PCBs at the SWMU 36/ AOC 620 Investigated Area
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- J** Copies of Waste Manifest Tickets for IM Excavated Soil

Acronyms and Abbreviations

2	ALM	Adult Lead Methodology
3	AOC	Area of concern
4	AST	Aboveground storage tank
5	BCT	BRAC Cleanup Team
6	BEQ	Benzo[a]pyrene equivalent
7	BRAC	Base Realignment and Closure Act
8	BRC	Background reference concentration
9	CA	Corrective action
10	CNC	Charleston Naval Complex
11	COC	Chemical of concern
12	COPC	Chemical of potential concern
13	DAF	Dilution attenuation factor
14	EnSafe	EnSafe Inc.
15	EPA	U.S. Environmental Protection Agency
16	EPC	Exposure point concentration
17	ft ²	Square feet
18	ft bls	Feet below land surface
19	HHRA	Human health risk assessment
20	HI	Hazard index
21	ILCR	Incremental lifetime cancer risk
22	IM	Interim measure
23	IMCR	Interim Measure Completion Report
24	LUC	Land use control
25	MCL	Maximum contaminant level
26	MCS	Media cleanup standard
27	MDL	Method detection limit
28	µg/L	Micrograms per liter
29	mg/kg	Milligrams per kilogram
30	mg/L	Milligrams per liter
31	NAVBASE	Naval Base

1 **Acronyms and Abbreviations, Continued**

2	NFA	No further action
3	OWS	Oil/water separator
4	PAH	Polynuclear aromatic hydrocarbon
5	Pb	Lead
6	PCB	Polychlorinated biphenyl
7	RBC	Risk-based concentration
8	RCRA	Resource Conservation and Recovery Act
9	RFA	RCRA Facility Assessment
10	RFI	RCRA Facility Investigation
11	RFIRA	RFI Report Addendum
12	SCDHEC	South Carolina Department of Health and Environmental Control
13	SPLP	Synthetic precipitation leaching procedure
14	SSL	Soil screening level
15	SWMU	Solid waste management unit
16	SVOC	Semivolatile organic compound
17	TCLP	Toxicity characteristic leaching procedure
18	UCL ₉₅	95-percent Upper Confidence Limit
19	UST	Underground storage tank
20	VOC	Volatile organic compound

1.0 Introduction

In 1993, Naval Base (NAVBASE) Charleston was added to the list of bases scheduled for closure as part of the Defense Base Realignment and Closure Act (BRAC), which regulates closure and transition of property to the community. The Charleston Naval Complex (CNC) was formed as a result of the dis-establishment of the Charleston Naval Shipyard and NAVBASE on April 1, 1996.

Corrective Action (CA) activities are being conducted under the Resource Conservation and Recovery Act (RCRA) with the South Carolina Department of Health and Environmental Control (SCDHEC) as the lead agency for CA activities at the CNC. All RCRA CA activities are performed in accordance with the Final Permit (Permit No. SC0 170 022 560).

In April 2000, CH2M-Jones was awarded a contract to provide environmental investigation and remediation services at the CNC. This submittal has been prepared by CH2M-Jones to complete the RCRA Facility Investigation (RFI) for Solid Waste Management Unit (SWMU) 36 and Area of Concern (AOC) 620 in Zone F of the Naval Complex, and to document the interim measure (IM) completed at the site. The site is recommended for a Corrective Measures Study (CMS). Figure 1-1 illustrates the location of SWMU 36/AOC 620 within Zone F. Figure 1-2 depicts an aerial photograph of SWMU 36/AOC 620.

1.1 Background

SWMU 36/AOC 620 includes Building 68, the former Battery Shop, as well as the immediately surrounding property on all sides of the building. Building 68 was composed of 58,000 square feet (ft²) of elevated concrete floor space, supported by piles and underlain by unpaved earth. The interior space included a room with generators and transformers near the center of the building, an acid storage tank room near the south-central wall, and a wash basin area near the northeast corner. Figure 1-3 shows the approximate locations of the generator/transformer room, the acid tank room, and the wash basin area. Figure 1-4 presents photographs of a decommissioned acid tank and a decommissioned wash basin inside Building 68. A loading dock surrounded the eastern, western, and half of the northern sides of the building.

Building 68 was located in the industrial area of Zone F, east of Hobson Avenue. The Zone E borderline is approximately 65 feet east of the building site, and the Zone G borderline is 20

to 40 feet south of the building. AOC 628, the Sand Blasting Area, is located directly southeast of Kilo Street (Thirteenth Street) across from AOC 620. AOC 619, the Former Oil Storage Yard, is located directly west of AOC 620. Both of these adjacent AOCs are considered for NFA status. The area surrounding Building 68 is expected to remain for industrial usage in the future. The building area is zoned for M-2 (heavy marine industrial land use).

From 1942 to 1952, Building 68 was used as a paint and oil storage facility. Beginning in 1952, it was used for the destruction, assembly, and rebuilding of large submarine batteries. Most recently, Building 68 was used for storage and charging of lead acid batteries for various equipment. In 1995 the building was decommissioned and operations ceased. The materials historically released, stored, or disposed of at AOC 620 include sulfuric acid, lead, paint, solvents, and petroleum products.

SWMU 36 is the site of two historical sulfuric acid releases, where acid was discharged within the acid tank room to floor drains in which the piping had separated. The separated piping reportedly allowed approximately 1,025 gallons of acid to leak onto the underlying unpaved ground surface. Following each spill, a sodium carbonate solution was used to neutralize the soil below the building.

The northeast portion of the building contained two shallow wash basins along the eastern wall. The basins drained to a former 6-inch drain line hung beneath the loading dock; the drain line led south to a sewer at the southeast corner of Building 68, and later to an underground storage tank (UST) located south of the building outside of the acid tank room. The acid UST was cleaned and decommissioned in 1995.

Until building demolition in late 2002, approximately 95 percent of SWMU 36/ AOC 620 was paved or under a roof. A grass-covered strip located at the south side of Building 68, and a railroad line area west of the west loading dock were not paved. The building was demolished in November and December 2002, and the site is to be used for future commercial or industrial purposes.

1.2 Purpose of the RFI Report Addendum/IM Completion Report

This report provides information about SWMU 36/ AOC 620 that documents the conclusions of the *Zone F RFI Report, Revision 0* (EnSafe Inc. [EnSafe], 1997) and provides the results of additional sampling performed after the report was completed. The results of

additional investigations and sampling that were not considered in the *Zone F RFI Report, Revision 0* are presented to complete the nature and extent evaluation for the chemicals of potential concern (COPCs) previously identified in surface soil, subsurface soil, and groundwater. Conclusions regarding site closure are also presented.

The soil excavation and disposal activities that were conducted as part of the four-phase IM performed at SWMU 36/ AOC 620 are documented in Section 7.0 of this report as an IM Completion Report. The IM pre-excavation and confirmation sampling data are presented along with the other RFI samples in this report.

Prior to changing the status of any site under the CNC RCRA CA permit, the BRAC Clean-Up Team (BCT) agreed that the following issues should be considered:

- Status of the RFI
- Presence of metals (inorganics) in groundwater
- Potential linkage to SWMU 37, Investigated Sanitary Sewers at the CNC
- Potential linkage to AOC 699, Investigated Storm Sewers at the CNC
- Potential linkage to AOC 504, Investigated Railroad Lines at the CNC
- Potential linkage to surface water bodies (Zone J)
- Potential contamination associated with oil/water separators (OWSs)
- Relevance or need for land use controls (LUCs) at the site

Information regarding these issues is provided in this RFI Report Addendum/IM Completion Report (RFIRA/IMCR) to expedite evaluation of closure of the site.

1.3 Report Organization

This RFIRA/IMCR consists of the following eight sections, including this introductory section:

1.0 Introduction — Presents the purpose of and background information relating to this RFIRA/IMCR.

2.0 Summary of RFI Conclusions for SWMU 36/AOC 620— Summarizes the sample results, risk evaluations, and conclusions for SWMU 36/ AOC 620 as presented in the *Zone F RFI Report, Revision 0*. This section also summarizes data collected for the Zone L RFI from samples that are geographically located within the SWMU 36/ AOC 620 investigated area.

3.0 Interim Measures, UST/AST Removals, and Oil/Water Separators—Briefly summarizes the IM conducted in four phases at SWMU 36/ AOC 620. This section also provides

information regarding any tank removal activities performed at the site, and the presence of onsite underground storage tanks (USTs) and OWSs.

4.0 Summary of Additional Investigations — Summarizes the information collected after completion of the *Zone F RFI Report, Revision 0*, including data collected for the IM excavation delineation.

5.0 COPC/COC Refinement—Provides further evaluation of chemicals of potential concern (COPCs) based on the RFI and additional data to assess them as COCs.

6.0 Summary of Information Related to Site Closeout Issues - Discusses the various site closeout issues that the BCT agreed to evaluate prior to site closeout.

7.0 Interim Measure Completion Report —Documents the soil removal IM conducted at SWMU 36/ AOC 620 for lead-impacted soils.

8.0 Conclusions and Recommendations—Presents the conclusions regarding the SWMU 36/ AOC 620 as reported in the *Zone F RFI Report, Revision 0*, as well as recommendations for proceeding with site closure.

9.0 References — Lists the references used in this document.

Appendix A contains excerpts from the *Zone F RFI Report, Revision 0*, and tables of detected concentrations in Zone L samples geographically located within the investigated site.

Appendix B provides responses to SCDHEC Comments on the *Zone F RFI Report, Revision 0*, specifically in regard to the SWMU 36/ AOC 620 investigated area.

Appendix C contains a well construction log for F620GW005.

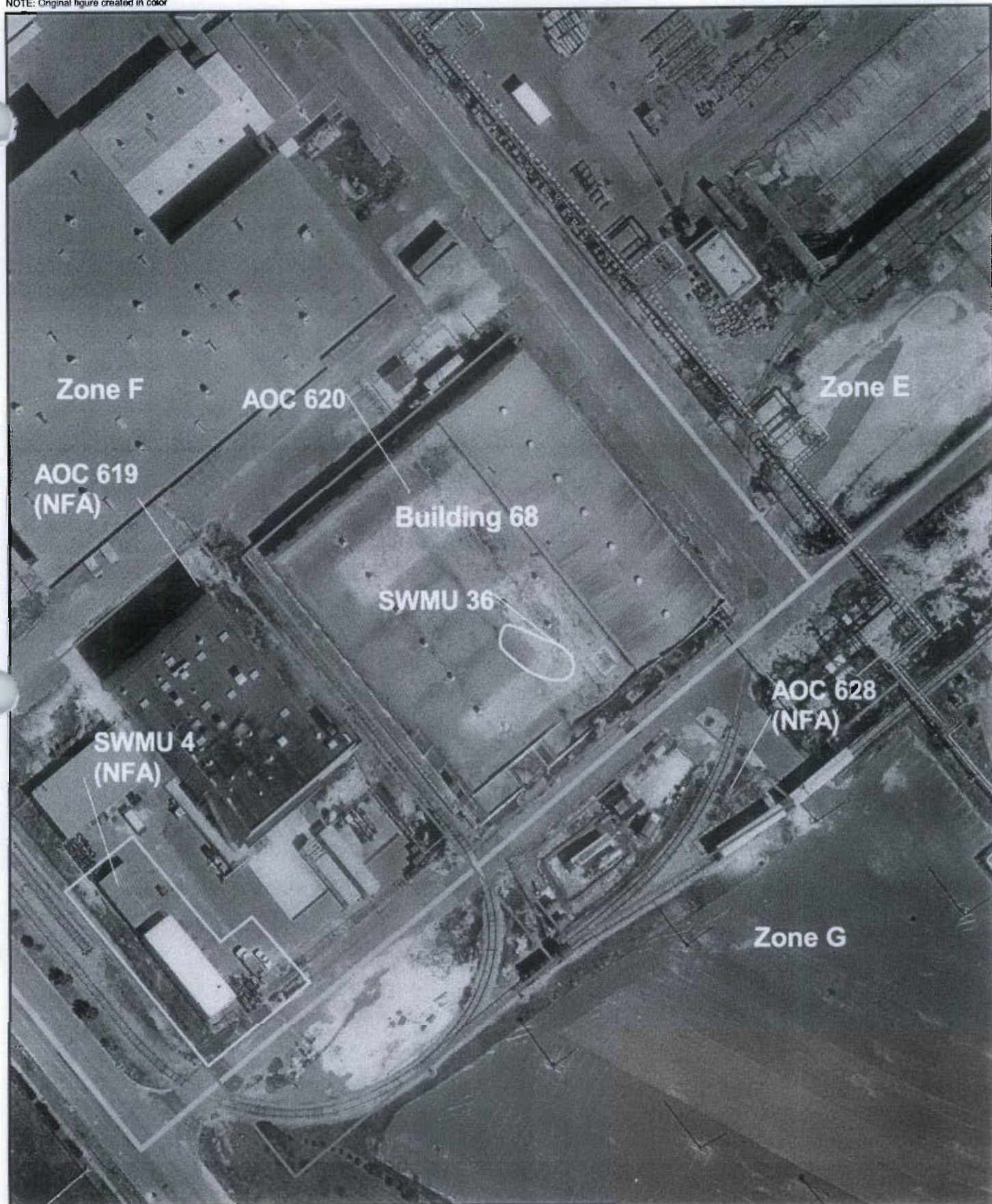
Appendix D contains a summary of analytical data from sampling performed subsequent to the *Zone F RFI Report, Revision 0*.

Appendix E contains data validation reports for the data from Zone F sampling performed subsequent to the *Zone F RFI Report, Revision 0*.

Appendix F contains a copy of the *Phase II Interim Measure Work Plan, SWMU 36/AOC 620, Zone F, Revision 0* (CH2M-Jones, 2001e).

Appendix G contains a summary of the 95-percent Upper Confidence Limit (UCL₉₅) calculations for polychlorinated biphenyls (PCBs) at the SWMU 36/ AOC 620 investigated area.

- 1 **Appendix H** contains photographs from the Wash Basin Area and Acid Tank Room Area
- 2 soil removal IM.
- 3 **Appendix I** contains the analytical data summaries for the soil imported to backfill the IM
- 4 excavations in the SWMU 36/ AOC 620 area.
- 5 **Appendix J** contains copies of the waste manifest tickets for the IM excavated soil.
- 6 All tables and figures appear at the end of their respective sections.



- AOC Boundary
- SWMU Boundary
- Zone Boundary

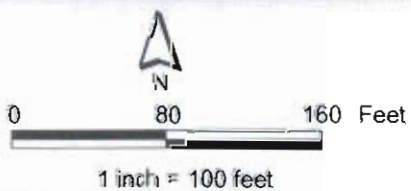
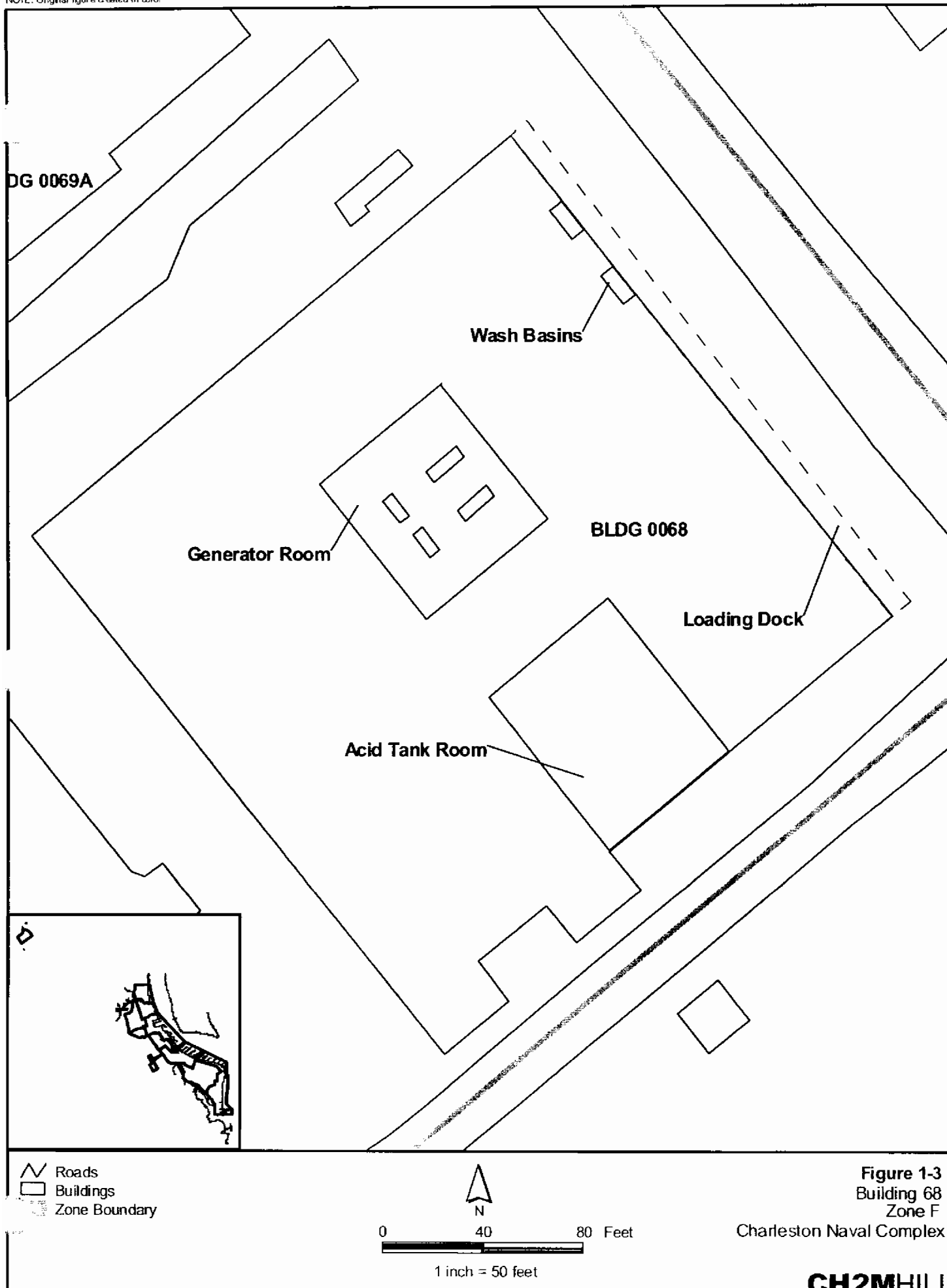


Figure 1-2.
Aerial Photo
SWMU 36/AOC 620
Charleston Naval Complex

NOTE: Original figure created in color





DECOMMISSIONED ACID TANK IN ACID TANK ROOM



DECOMMISSIONED WASH BASIN; NORTHEAST CORNER OF BUILDING 68

Figure 1-4
Decommissioned Acid Tank and Wash Basin
AOC620, Zone F
Charleston Naval Complex

2.0 Summary of RFI Conclusions for SWMU 36/AOC 620

This section summarizes the results and conclusions from the soil and groundwater investigations conducted at SWMU 36/AOC 620, which were reported in the *Zone F RFI Report, Revision 0* (EnSafe, 1997). Copies of summary tables of the detected compounds from the RFI report are included in Appendix A of this RFIRA/IMCR. Responses to the comments prepared by SCDHEC on the *Zone F RFI Report Revision 0* in regard to the SWMU 36/AOC 620 investigated area, are provided in Appendix B of this report.

Figure 2-1 depicts the soil and groundwater sample locations discussed in the *Zone F RFI Report, Revision 0*. As part of EnSafe's field investigation from 1996 to 1997, 12 soil borings were advanced during two phases of work. Nine borings (F036SB001 through F036SB003 and F620SB001 through F620SB006) were advanced during the first (1996) phase of the investigation. Surface (0 to 1 feet below land surface [ft bls]) and subsurface (3 to 5 ft bls) samples were collected from three of these borings (F036SB001, F620SB005, and F620SB006). Surface samples only were collected from the remaining six borings, because of the shallow depth of the water table and/or subsurface obstructions. Laboratory analysis included metals (all samples), volatile organic compounds (VOCs) (all samples), semivolatile organic compounds (SVOCs) (all samples), pesticides (four surface samples), PCBs (four surface samples), and cyanide (one surface sample). Three borings (F620SB007 through F620SB009) were advanced during the second (1997) phase of the investigation, in an attempt to delineate lead and PCB impacts. Both surface and subsurface samples were collected from each of the three borings; they were analyzed for metals, SVOCs, naphthalene, pesticides, and PCBs.

Four monitoring wells were installed at the site. Figure 2-1 depicts locations of these groundwater wells. Two wells, F620GW001 and F620GW002, were installed during the first (1996) phase of the investigation. Both wells were sampled a total of four times, including one event in 1997 which was not addressed in the *Zone F RFI Report, Revision 0*. Section 4.0 presents additional information regarding this sampling activity. Groundwater samples collected from these two wells were analyzed for the presence of VOCs, SVOCs, and metals. The remaining two wells, F620GW003 and F620GW004, were installed during the second phase of the investigation (1997). These two wells were sampled three times, including two

events not addressed in the RFI report (see Section 4.0). The first sampling event involved analyses for pH and metals only.

The *Zone F RFI Report, Revision 0* presented the analytical results of these samples and conclusions concerning site contamination and human health risk. Additional soil and groundwater samples were collected subsequent to the RFI report and are discussed in Section 4.0 of this RFIRA/IMCR. Conclusions from the *Zone F RFI Report, Revision 0* are summarized below.

2.1 Soil Sampling and Analysis

Results of the soil analyses were compared to the following screening criteria:

- U.S. Environmental Protection Agency (EPA) Region III unrestricted (i.e., residential) land use risk-based concentrations (RBCs) adjusted for a hazard index (HI) of 0.1.
- EPA soil screening levels (SSLs) based on a dilution attenuation factor (DAF)=20, as listed in Appendix A, Table A-1 of the *EPA Soil Screening Guidance: Technical Background Document* (EPA, 1996).
- Zone F background reference concentrations (BRCs) for surface or subsurface soil, for inorganics.

Subsurface soils were compared to SSLs and, for inorganics, Zone F BRCs.

Analytes that exceeded the screening criteria were considered COPCs and were further evaluated in the risk assessment to determine which of these parameters would be considered COCs.

2.1.1 Surface Soil Results

Several VOCs and pesticides were detected at low levels in surface soil, all below their EPA Region III residential RBCs and SSLs. Of the SVOCs analyzed, polynuclear aromatic hydrocarbons (PAHs), expressed as benzo[a]pyrene equivalents (BEQs), were reported above the residential RBC for benzo[a]pyrene in seven surface soil samples located beneath the SWMU 36 area inside the building, and outside the eastern quadrant of Building 68. The highest concentration reported for BEQs in surface soil in the SWMU 36/AOC 620 investigated area was 1.17 milligrams per kilogram (mg/kg) at F620SB008, which is located across the street from Building 68 along the railroad lines in Zone G. All other BEQ concentrations were measured at less than 0.66 mg/kg.

Aroclor-1254 (reported at 0.29 mg/kg) and Aroclor-1260 (reported at 0.43 mg/kg) were detected above their respective screening concentrations (0.16 and 0.32 mg/kg) in one sample, at soil boring location F620SB004, located outside of the acid tank room. The reported concentrations are average values calculated from the concentrations of the normal field sample and the duplicate field sample. The normal and duplicate sample concentrations were similar in concentration.

Aluminum (21,100 mg/kg at F620SB008), arsenic (22.6 mg/kg at F620SB008 and 31.5 mg/kg at F620SB007), and chromium (43.2 mg/kg at F620SB008) were detected at concentrations exceeding their respective residential RBCs and Zone F BRCs. Lead was detected below its COPC screening criteria (400 mg/kg) in all but two surface soil samples: F036SB001 at 1,600 mg/kg, inside the acid tank room, and 4,250 mg/kg at F620SB004, outside the acid tank room. The sample from F620SB004 was collected with a field duplicate in which the lead concentration was measured at 1,070 mg/kg. Therefore, lead at F620SB004 was reported as the mean concentration between the normal sample and the duplicate sample, at 2,660 mg/kg.

No VOCs, SVOCs, PCBs, or pesticides were reported as exceeding their respective SSLs. Arsenic, chromium, and lead were reported as exceeding their SSLs (DAF=20). The fate and transport discussion in the *Zone F RFI Report, Revision 0* stated that "...inorganic exceedences are limited to the interior of Building 68, and the area immediately to the southeast of this building....consistent with past site activities" The Navy/EnSafe team concluded that, although arsenic, chromium, and lead were present at concentrations exceeding their SSLs, the risk associated with potential impact to groundwater was limited, due to the fact that "...the soil does not contain enough residual mass to pose a threat to groundwater."

2.1.2 Subsurface Soil Results

Of the VOCs, SVOCs, pesticides, PCBs, and metals analyzed in subsurface soil, only chromium and 4-methylphenol were detected at concentrations exceeding their respective COPC screening values. 4-methylphenol was detected at F036SB001 at 2.2 mg/kg, which exceeds the SSL of 1.38 mg/kg. Chromium was detected in excess of the Zone F BRC of 32.2 mg/kg and the SSL of 38 mg/kg in two samples, at F036SB001 (57.9 mg/kg) and F620SB007 (141 mg/kg).

The fate and transport discussion of the *Zone F RFI Report, Revision 0* concluded "...the absence of 4-methylphenol in downgradient groundwater indicates...its lateral persistence is insignificant at this site." Potential groundwater impacts from chromium in subsurface soil, as referenced in Section 2.1.1, were addressed in the RFI report.

2.2 Groundwater Sampling and Analysis

The results of groundwater analyses were compared against the Zone F BRCs and EPA Region III tap water RBCs. Analytes that exceeded the screening criteria were considered COPCs and were further evaluated in the risk assessment to determine which of these parameters would be considered COCs. Copies of summary tables of detected compounds from the *Zone F RFI Report, Revision 0* are included in Appendix A of this RFIRA/IMCR.

The *Zone F RFI Report, Revision 0* reported that no VOCs were detected in groundwater at this site. Six SVOCs were detected during the first three sampling events, but no concentrations exceeded screening criteria.

Barium concentrations ranging from 460 to 701 micrograms per liter ($\mu\text{g/L}$) were detected at F620GW001, and exceeded the EPA residential RBC of 260 $\mu\text{g/L}$ and the Zone F BRC of 94.3 $\mu\text{g/L}$. Lead concentrations exceeded the reported RBC of 15 $\mu\text{g/L}$ in the second sampling event at F620GW004 (30.7 $\mu\text{g/L}$). Lead was not detected in the third sampling event; a Zone F BRC was not developed for lead. However, this well was not installed before the first sampling event and its data were not used for the site risk assessment. Thallium was detected in one sample at a concentration greater than the BRC of 5.58 $\mu\text{g/L}$ and the RBC of 0.29 $\mu\text{g/L}$ at F620GW001 (11 $\mu\text{g/L}$). No other metals were detected in groundwater at concentrations exceeding screening criteria.

The fate and transport discussion in the *Zone F RFI Report, Revision 0* concluded that barium, thallium, and lead exceeded the EPA Region III tap water RBC, however, exposure to potential receptors via the groundwater pathway was invalid, due to the fact that "the surficial groundwater is not used for potable purposes, nor is it planned to be in the future." Furthermore, possible impacts associated with the groundwater migration and release to the surface water pathway were considered insignificant, because of natural attenuation likely to occur during the transport from the site to the Cooper River.

2.3 HHRA Summary from the *Zone F RFI Report, Revision 0*

The human health risk assessment (HHRA) in the *Zone F RFI Report, Revision 0* identified BEQs, Aroclor-1254, Aroclor-1260, aluminum, arsenic, chromium, and lead as COCs in surface soil at SWMU 36/ AOC 620 under the unrestricted (i.e., residential) land use scenario. The assessment was based on an incremental lifetime cancer risk (ILCR) and cumulative HI projections. Incidental ingestion and dermal contact were considered as potential exposure pathways. Lead exposure was addressed using the Lead

Uptake/Biokinetics Model to develop target concentrations protective of a child resident. Only BEQs and arsenic were identified as surface soil COCs for the industrial (site worker) exposure scenario, based on ILCR projections.

Exposure (ingestion) to shallow groundwater was evaluated assuming a residential scenario, and was based on the results of the first quarter sampling event from monitoring wells F620GW001 and F620GW002. Thallium was determined to be the primary risk driver for the HI projections (approximately 95 percent of the cumulative HI), while barium was a secondary contributor to HI projections. Lead was not identified as a COPC from the first sampling event. However, thallium and barium were presented in the RFI report as the key risk drivers associated with first quarter groundwater data.

The *Zone F RFI Report, Revision 0* identified the following surface soil COCs:

- BEQs
- Aroclor-1254
- Aroclor-1260
- Aluminum
- Arsenic
- Chromium
- Lead

No COCs were identified in subsurface soil.

The following groundwater COCs were identified, based on first quarter groundwater sampling data:

- Thallium
- Barium

All of the chemicals listed above are further discussed in Section 5.0.

2.4 Additional Data from Zone L Investigations

Data from Zone L sites AOC 699 (Storm Sewer System) and SWMU 37 (Sanitary Sewer System) were also collected within the geographical area of SWMU 36/ AOC 620. Figure 2-2 shows the sample locations. These samples were not originally considered in the evaluation for the RFI at SWMU 36/ AOC 620. The data for these samples were presented in the *Zone L RFI Report, Revision 0* (EnSafe, 1998); detected parameters for soil samples are also presented in Appendix A of this RFI Report Addendum.

2.4.1 Soil Results (Zone L RFI)

Within the SWMU 36/AOC 620 investigative area, direct-push soil probes from two locations were sampled in conjunction with SWMU 37, and two locations were sampled for the AOC 699 investigation. The samples from LF699SP001, LF699SP002, LF037SP030, and LG037SP002 were analyzed for cyanide, metals, and VOCs. The sample depths were not reported; therefore, it was assumed that the samples were collected near the depths of the sewer lines, and that they were composed of subsurface soil.

Metals and traces of cyanide were detected in the soil probe samples; no VOCs were detected. Detected parameters from the four Zone L soil samples are listed in Appendix A of this report. Data from SWMU 37 and AOC 699 soil probes have been compared to Zones F and G subsurface soil background concentrations and to SSLs published in the EPA *Soil Screening Guidance: Technical Background Document* (1996), based on a DAF=10. All parameters were less than screening criteria, with the exceptions of antimony and chromium.

Antimony was detected at LF699SP001 and LF699SP002 at concentrations of 2.67 and 4.28 mg/kg, respectively, which is in exceedance of the SSL of 2.5 mg/kg. Both samples were located near the southeast corner of Building 68. No background range was identified for antimony in Zones F or G, although the concentrations detected at the site are within the CNC-wide background range of 0.22 to 23 mg/kg. Chromium was detected at LF699SP001 and LF699SP002 at concentrations of 81.4 and 67.6 mg/kg, respectively, which is in exceedance of the SSL of 19 mg/kg as well as the Zones F and G background range of 7.4 to 65 mg/kg. Therefore, antimony and chromium are considered COPCs in subsurface soil and are further discussed in Section 5.0 of this RFIRA/IMCR.

2.4.2 Groundwater Results (Zone L RFI)

Direct-push probes from three locations at SWMU 37 and five locations at AOC 699 in the SWMU 36/AOC 620 area were sampled for groundwater and analyzed for cyanide, metals, and VOCs. The BCT has agreed that the metals data from these unfiltered probe samples are not considered to be representative of groundwater quality, and therefore are not evaluated. No VOCs or cyanide were detected in the groundwater probe samples.

NOTE: Original figure created in color

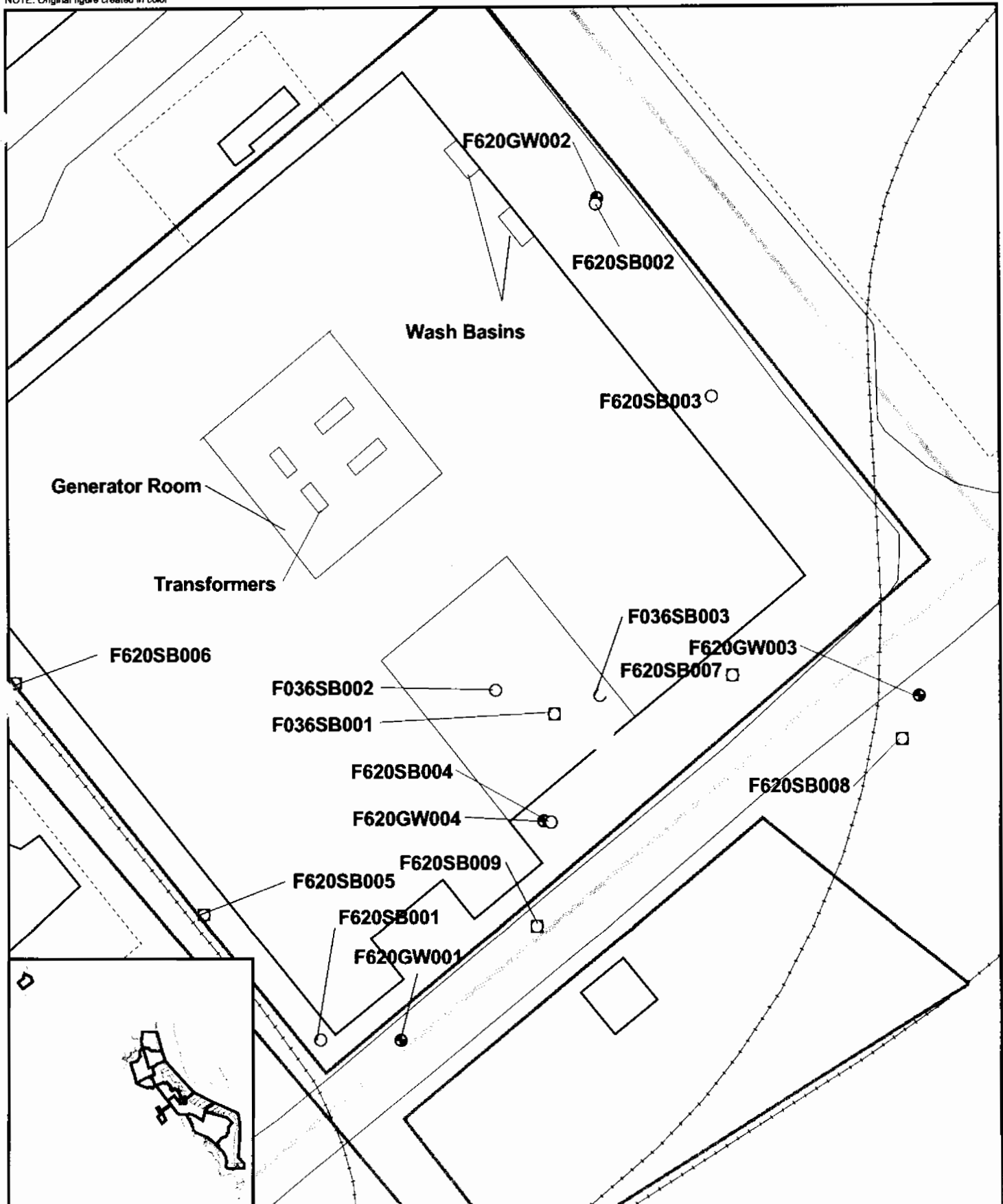
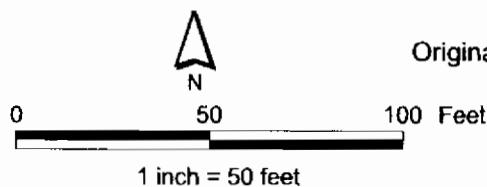


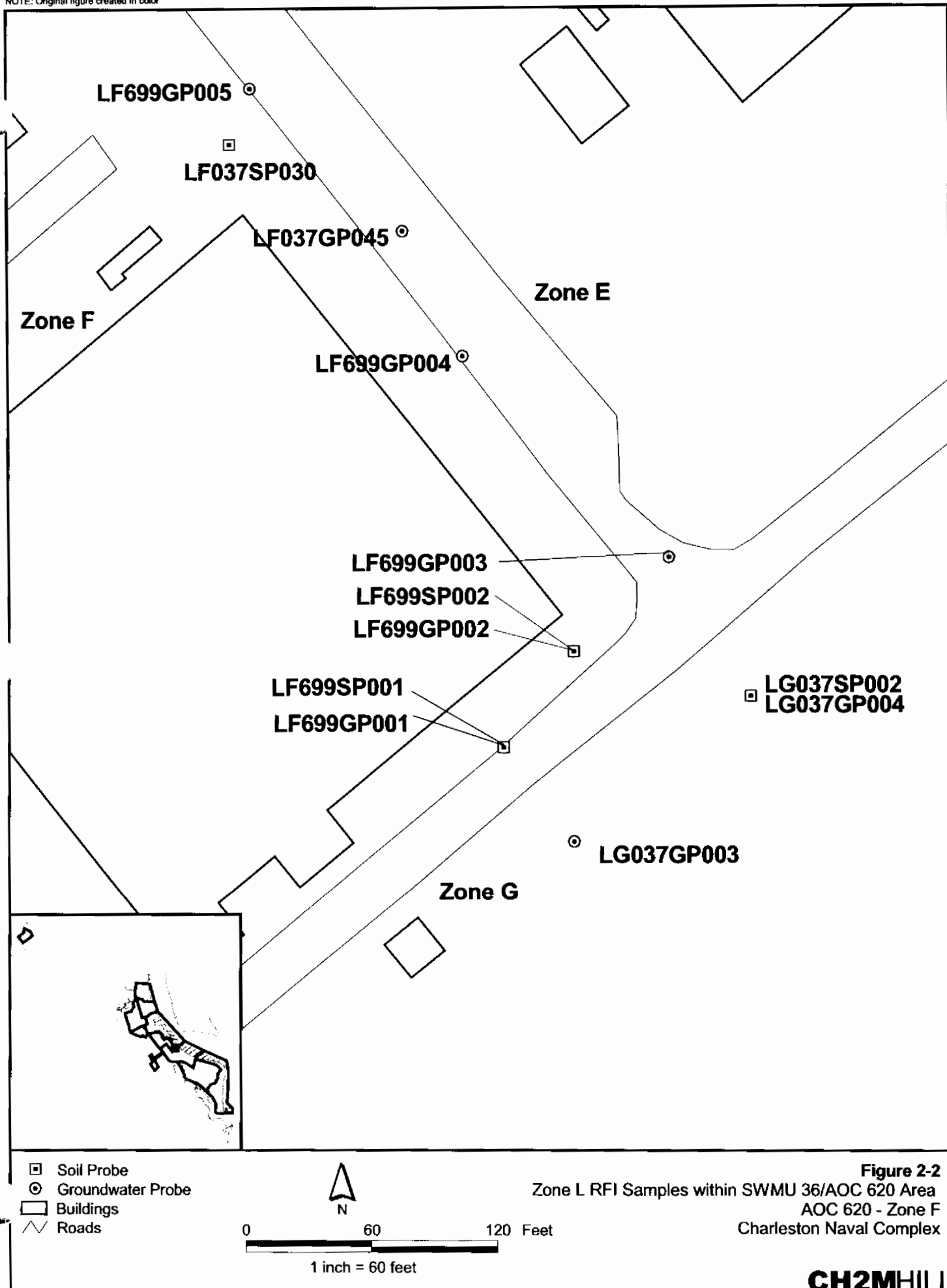
Figure 2-1
Originally Reported RFI Sample Locations
AOC 620 - Zone F
Charleston Naval Complex

- Groundwater Well
- Surface Soil
- Subsurface Soil
- Railroads
- - - Fence
- Roads
- AOC Boundary
- SWMU Boundary
- Buildings
- - - Zone Boundary



CH2MHILL

NOTE: Original figure created in color



3.0 Interim Measures, UST/AST Removals, and Oil/Water Separators

In 2002, lead-impacted soil was removed from two areas of AOC 620 to levels consistent with the media cleanup standards (MCSs) developed for the site. The IM was conducted in four phases:

- Phase I consisted of pre-excavation soil and groundwater sampling to delineate the extent of elevated lead;
- Phase II consisted of soil excavation in the wash basin area;
- Phase III consisted of soil excavation in the acid tank room area after the demolition of Building 68; and
- Phase IV consisted of additional post-demolition sampling.

Details associated with the activities performed during the IM are presented in Section 7.0 of this report. The details and results of sampling for the IM are discussed in Sections 4.0 and 5.0 of this RFIRA/IMCR.

A UST was located south of the acid tank room to collect discharge from floor drains within the building, including the acid tank room. The UST was not used for the storage of any organic chemicals such as petroleum products or waste oil. This UST was cleaned and decommissioned in 1995. Groundwater monitoring wells F620GW003 and F620GW004 are located in the UST vicinity. Samples from these two wells and from direct-push technology (DPT) sample LF699GP001 were used to adequately characterize the groundwater near the UST. In addition, subsurface soil samples collected for IM pre-excavation delineation, as well as DPT sample LF699SP001, were used to characterize the subsurface soil in the vicinity of the UST.

Aboveground storage tanks (ASTs) were used for acid storage within the building, particularly in the acid tank room. These tanks are considered part of AOC 620, and releases from the tanks have been investigated as part of the SWMU 36 investigation. There are no records of other USTs or ASTs containing organic or petroleum-based products, or OWSs located at SWMU 36/AOC 620.

4.0 Summary of Additional Investigations

After issuing the *Zone F RFI Report, Revision 0* (EnSafe, 1997), additional field activities were conducted in four separate events at SWMU 36/AOC 620. The Navy/EnSafe team performed the first of these additional sampling events in 1999 to delineate the extent of metals contamination in soils where elevated concentrations were previously identified.

CH2M-Jones conducted a second sampling event in June 2001 to continue investigating the nature of the contamination. The third sampling event was conducted from October 2001 through February 2002 as pre-excavation delineation sampling for the IM at AOC 620. The fourth sampling event consisted of sampling after the demolition of Building 68, as part of the IM activities. These samples are all considered RFI samples and were used to evaluate site conditions and health risks at SWMU 36/AOC 620. The post-demolition IM confirmation samples are described in this section and in Section 7.0 (IM Completion Report). Some of the samples described in this section represent soils that were removed during the IM excavations.

This section also presents the results of groundwater sampling performed in 1997 and 1998 to complete the original four RFI sampling events at site monitoring wells, as well as the results from the 2001 sampling to evaluate the potential presence of lead in groundwater. In 2001, groundwater monitoring well F620GW003 was inadvertently destroyed during utility excavation. This well was replaced in the same location, and identified as Station ID F620GW005. The construction log for the new well is included in Appendix C of this RFIRA/IMCR.

4.1 Soil Sampling and Analysis – 1999 and June 2001 Sampling Events

During the latter part of 1999, additional field activities were conducted in general accordance with the *Zone F RFI Work Plan Addendum* (EnSafe, 1999). Five additional soil borings (F620SB010 through F620SB014) were advanced at the south side of Building 68 in an attempt to delineate metals impacts in this area. The locations of these borings are shown on Figure 4-1. Surface and subsurface samples collected from soil borings F620SB010 and F620SB011 were analyzed for metals, PCBs, and pesticides. Surface and subsurface samples collected from soil borings F620SB012 through F620SB014 were analyzed for metals and

SVOCs. As part of a synthetic precipitation leaching procedure (SPLP) study, new surface and subsurface soil samples were also collected at previous boring location F620SB008. Each SPLP soil sample and its corresponding leachate were analyzed for VOCs, SVOCs, metals, pesticides, PCBs, and cyanide. The complete analytical data from the additional investigation and data validation reports are provided in Appendices D and E, respectively. All metals data from the 1999 leachate analyses, and non-metal parameters detected in the leachate, are also presented in Appendix D.

To evaluate the extent of potential releases from the generator room, wash basin area, and north side of the building, additional samples were collected at AOC 620, as described in the *Zone F RFI Work Plan Addendum, Revision 1* (CH2M-Jones, 2001a). In June 2001, CH2M-Jones advanced seven soil borings (F620SB015 through F620SB021) in and around Building 68. Surface (0 to 1 ft bls) samples were collected from F620SB015, F620SB016, F620SB019, F620SB020, and F620SB021 and analyzed for the presence of PCBs. Subsurface (2 to 3 ft bls) samples were also collected from F620SB019, F620SB020, and F620SB021, and analyzed for PCBs. The subsurface sample depth interval was raised to 2 to 3 ft bls to avoid saturated soils below the groundwater table. Surface and subsurface samples collected from two locations, F620SB017 and F620SB018, were analyzed for the full list of chemicals, to include VOCs, SVOCs, and metals; PCBs were also analyzed in the surface samples. Surface and subsurface samples planned for further arsenic delineation in the area southeast of AOC 620 were not collected because it was determined that site arsenic concentrations had been adequately delineated to area background levels.

Analytical results from the additional soil samples were compared to the appropriate screening criteria. Surface soil results were compared to EPA Region III residential RBCs adjusted for HI=0.1, and to SSLs from the EPA *Soil Screening Guidance: Technical Background Document* (1996), based on a DAF=1 for VOCs and adjusted to a DAF=10 for all other parameters. In addition, inorganic compounds were compared to the range of data from background (grid) samples collected from Zones F and G. The data sets for both zones were used because of the small number of background samples collected in each zone, and because AOC 620 is adjacent to Zone G. BEQs were compared to CNC-wide background concentrations for surface or subsurface soil, as appropriate. When both the background range and the RBC or SSL concentrations were exceeded, the chemical was selected as a COPC.

Subsurface soil results were compared to Zones F and G background ranges and to SSLs. When both criteria were exceeded, the chemical was selected as a COPC for the soil-to-

groundwater migration pathway. Tables 4-1 through 4-4 present summaries of detected analytes from surface and subsurface soils collected during the 1999 and June 2001 sampling efforts. The analytical results that exceed the appropriate screening criteria appear in bold font within the tables.

4.1.1 Surface Soil Results

A summary of detected parameters from surface soil data collected during the 1999 and June 2001 sampling efforts is presented in Tables 4-1 and 4-2. Table 4-1 presents data for inorganic parameters, and Table 4-2 presents the detected concentrations for VOCs, SVOCs, PCBs, and pesticides. Analytes that exceeded screening criteria are shown in bold and outlined within the tables.

As noted in Table 4-1, when compared to the screening criteria described above, antimony (with a maximum concentration of 48.5 mg/kg), lead (maximum concentration of 18,400 mg/kg), and mercury (maximum concentration of 5.05 mg/kg) were detected at elevated concentrations in samples located in the wash basin area, at soil borings F620SB017 and F620SB018. The metals concentrations exceeded the background range and both the residential RBC and SSL screening values.

As noted in Table 4-2, the surface soil at soil boring F620SB017 also contained concentrations of BEQs (1.683 mg/kg) above the sitewide reference concentration of 1.304 mg/kg. Of the additional samples analyzed for PCBs, Aroclor-1254 was detected above the residential RBC (0.32 mg/kg) in two samples from beneath the generator room, with a maximum detected concentration of 1.12 mg/kg. Concentrations of Aroclor-1260 were measured below the RBC.

Although VOCs, other SVOCs, and pesticides were detected in the additional samples, the concentrations were less than comparison criteria.

4.1.2 Subsurface Soil Results

A summary of detected parameters from subsurface soil data collected during the 1999 and June 2001 sampling events is presented in Tables 4-3 and 4-4. Table 4-3 presents data for inorganic parameters, and Table 4-4 presents detected concentrations for VOCs, SVOCs, PCBs, and pesticides. Analytes that exceeded screening criteria are shown in bold text and outlined within the tables.

Lead (with a maximum concentration of 1,350 mg/kg) and mercury (maximum concentration of 4.32 mg/kg) were detected at elevated concentrations in the subsurface soil

1 in the wash basin area, at the same locations with elevated surface soil concentrations,
2 F620SB017 and F620SB018. Antimony and BEQ concentrations at these locations were
3 within the background range.

4 Chromium was detected at 269 mg/kg in a subsurface soil sample from soil boring
5 F620SB008, which is located south of Building 68. This location had been previously
6 sampled with a measured chromium concentration of 15.8 mg/kg, which is within the
7 background range.

8 No VOCs, SVOCs, or pesticides were detected at concentrations above the COPC screening
9 criteria. PCBs were detected in subsurface soil beneath the generator room, at a maximum
10 concentration of 0.253 mg/kg, which is below the SSL of 0.55 mg/kg for Aroclor-1254.

11 **4.2 Soil Sampling and Analysis - Pre-Excavation and Post-** 12 **Demolition IM Sampling Events**

13 **4.2.1 Phase I IM Pre-Excavation Sampling Results (October 2001 - February 2002)**

14 As part of an IM to remove lead-impacted soils at SWMU 36/ AOC 620, pre-excavation
15 samples were collected as described in the *Phase I IM Work Plan - Pre-Excavation Sampling*
16 *and Analysis Plan for AOC 620/SWMU 36, Zone F* (CH2M-Jones, 2001c). Figure 4-2 presents
17 locations of the pre-excavation IM samples. Thirty-nine surface soil (0 to 1 ft bls) and 36
18 subsurface soil (2 to 3 ft bls) samples were collected for the pre-excavation IM at AOC 620.
19 Soil borings F620SB022 through F620SB035 and F620SB053 through F620SB057 were
20 collected in the wash basin area, and soil borings F620SB036 through F620SB046 and
21 F620SB058 through F620SB067 were collected in the acid tank room area. Subsurface
22 obstructions were encountered adjacent to the loading dock in the wash basin area,
23 therefore, subsurface soil samples were not collected at locations F620SB029, F620SB030, or
24 F620SB031. Soil samples designated 620SB058 and 620SB059 were collected at previous
25 sample locations F620SB036 through F620SB038 for waste disposal evaluation. Soil samples
26 from locations designated F620SB054 and F620SB057, each composited from two aliquots,
27 were also collected for waste disposal evaluation.

28 All soil samples were analyzed for lead, except for samples collected at F620SB058 and
29 F620SB059, which were analyzed only for pH and TCLP lead. Composite samples 620SB054
30 and 620SB057 were analyzed for total lead, pH, and TCLP lead. Fourteen samples were
31 analyzed for SPLP lead, in order to determine leachability potential by estimating a site-
32 specific partitioning coefficient for lead. In addition, surface samples from F620SB023,

F620SB029, and F620SB030, and surface and subsurface soil samples from F620SB022, F620SB034, and F620SB053 in the wash basin area were analyzed for mercury by SPLP tests. Results of the pre-excavation IM sampling are presented in Table 4-5 for surface soil and Table 4-6 for subsurface soil. Lead concentrations were compared to the COPC screening concentration of 400 mg/kg, and the combined Zones F and G background range of 3.5 to 275 mg/kg for surface soil and 2.4 to 123 mg/kg for subsurface soil. Mercury concentrations were compared to the residential RBC (adjusted for HI=0.1) of 2.3 mg/kg, the generic SSL (DAF=10) of 1.0 mg/kg, and the Zones F and G background ranges of 0.06 to 2 mg/kg for surface soil and 0.04 to 0.57 mg/kg for subsurface soil. SPLP and TCLP leachate results are also presented in Tables 4-5 and 4-6; these data are discussed in Sections 5.0 and 7.0 of this RFIRA/IMCR.

4.2.2 Phases III and IV Post-Demolition IM Sampling Results (November 2002 - January 2003)

After Building 68 was demolished, allowing access to the soils beneath the acid tank room, confirmation surface soil samples were collected around the perimeter of the area delineated as a result of the Phase I IM sampling effort, per the Phase III IM Work Plan. These samples were collected to evaluate if the demolition process had shifted any lead-impacted surface soils outside of the target IM area. Surface soil at sample locations F620SB068 through F620SB072 was analyzed for lead; the locations are shown in Figure 4-2.

The Phase IV IM involved collecting additional surface and subsurface (1 to 2 ft bls) samples in the area immediately south of the acid tank room, where elevated lead concentrations had been detected in soil in 1996 during monitoring well F620GW004 construction. Samples 620SB073 through 620SB076 were collected as described in the Technical Memorandum AOC 620; *Phase IV Interim Measure Soil Removal* (CH2M-Jones, 2002b). The soil samples were analyzed for lead; their locations are shown in Figure 4-2. The results of the sampling are presented in Tables 4-5 for surface soil and 4-6 for subsurface soil.

4.2.3 Surface Soil Results– IM Pre-Excavation and Post-Demolition Sampling

Six surface soil samples from beneath the loading dock in the wash basin area had lead concentrations that exceeded the generic screening criteria, with a maximum concentration of 1,820 mg/kg. Nine surface soil samples from beneath and south of the acid tank room also had lead concentrations that exceeded the screening criteria, with a maximum concentration of 2,350 mg/kg. No surface soil mercury concentrations exceeded the screening criteria for mercury.

4.2.4 Subsurface Soil Results – IM Pre-Excavation and Post-Demolition Sampling

Four subsurface soil samples from beneath the loading dock in the wash basin area had lead concentrations that exceeded screening criteria, where the maximum detected concentration was 1,120 mg/kg. Seven subsurface soil samples from beneath and south of the acid tank room also had lead concentrations that exceeded the SSL, at a maximum concentration of 3,880 mg/kg.

One subsurface soil sample located beneath the loading dock in the wash basin area had mercury levels at 1.52 mg/kg, which exceeded the generic SSL and the background range for mercury.

4.3 Groundwater Sampling and Analysis

In 2001, shallow groundwater monitoring well F620GW003 was inadvertently destroyed during utility excavation. This well was replaced in the same location with F620GW005. The construction log for the new well is included in Appendix C of this RFIRA/IMCR.

Groundwater elevations were measured on May 14, 2002, showing a northeasterly groundwater flow direction. The resulting potentiometric surface map for the shallow groundwater at AOC 620 is presented in Figure 4-3.

One additional groundwater sampling event was performed for F620GW001 and F620GW002 in 1997; two additional sampling events were performed for F620GW003 and F620GW004 in 1997 and 1998. The samples were analyzed for VOCs, SVOCs, and metals. In October 2001, monitoring well F620GW002 was sampled for lead and mercury, and F620GW004 was sampled for lead.

Naturally occurring metals were detected in the groundwater samples, along with trace level concentrations of acenaphthene, ethylbenzene, and xylenes in the 1997 samples, in the wells located near the buried fuel lines south of Kilo Street, southeast of the building.

Groundwater analytical results were compared to Zone F BRCs and the maximum contaminant levels (MCLs). In the absence of an MCL, the tap water RBC was used. A comparison of the additional groundwater data to the screening criteria indicated that no analytes exceed both BRCs and MCLs. Tables 4-7 and 4-8 summarize the detected analytes in the additional groundwater samples.

1 **4.4 Summary of COPCs**

- 2 On the basis of the screening described above, antimony, lead, mercury, PCBs, and BEQs
3 were identified as COPCs in surface soil. Chromium, lead, and mercury were identified as
4 COPCs in subsurface soil. No COPCs were identified in groundwater.

TABLE 4-1

Inorganic Compounds Detected in Surface Soil; 1999 and June 2001 RFI Addendum Investigations
RFI Report Addendum and IM Completion Report, SWMU 36/AOC 620, Zone F, Charleston Naval Complex

Analyte	Sample Location	Concentration (mg/kg)	Qualifier	Date Collected	EPA Region III Residential RBC ^a	Soil-to-Groundwater SSL ^b	Range of Background Concentrations ^c
Aluminum	F620SB008	6,750	=	15-Oct-99	7,800	NL	2,190 - 19,400
	F620SB010	5,620	J	17-Nov-99			
	F620SB011	8,450	J	16-Nov-99			
	F620SB012	6,120	J	16-Nov-99			
	F620SB013	13,000	J	16-Nov-99			
	F620SB014	4,860	J	16-Nov-99			
	F620SB017	8,300	=	06-Jun-01			
	F620SB018	2,680	=	06-Jun-01			
Antimony	F620SB008	1.7	J	15-Oct-99	3.1	2.5	0.5 - 5.9
	F620SB017	0.67	J	06-Jun-01			
	F620SB018	48.5	J	06-Jun-01			
Arsenic	F620SB008	15.1	J	15-Oct-99	0.43	15	3 - 30
	F620SB010	2.6	J	17-Nov-99			
	F620SB011	4.8	J	16-Nov-99			
	F620SB012	27.3	J	16-Nov-99			
	F620SB013	12.4	J	16-Nov-99			
	F620SB014	18.5	J	16-Nov-99			
	F620SB017	5.12	=	06-Jun-01			
	F620SB018	3.18	=	06-Jun-01			
Barium	F620SB008	27.2	=	15-Oct-99	550	800	11 - 129
	F620SB010	34.3	J	17-Nov-99			
	F620SB011	15	J	16-Nov-99			
	F620SB012	21.9	J	16-Nov-99			
	F620SB013	30.8	J	16-Nov-99			
	F620SB014	27.2	J	16-Nov-99			
	F620SB017	23.2	J	06-Jun-01			
	F620SB018	76	J	06-Jun-01			
Beryllium	F620SB008	0.31	J	15-Oct-99	16	32	0.19 - 1.3
	F620SB010	0.16	J	17-Nov-99			

TABLE 4-1

Inorganic Compounds Detected in Surface Soil; 1999 and June 2001 RFI Addendum Investigations
RFI Report Addendum and IM Completion Report, SWMU 36/AOC 620, Zone F, Charleston Naval Complex

Analyte	Sample Location	Concentration (mg/kg)	Qualifier	Date Collected	EPA Region III Residential RBC ^a	Soil-to-Groundwater SSL ^b	Range of Background Concentrations ^c
Beryllium	F620SB011	0.33	J	16-Nov-99	16	32	0.19 - 1.3
	F620SB012	0.33	J	16-Nov-99			
	F620SB013	0.69	=	16-Nov-99			
	F620SB014	0.19	J	16-Nov-99			
	F620SB017	0.29	J	06-Jun-01			
Cadmium	F620SB008	0.29	J	15-Oct-99	3.9	4	0.12 - 1.7
	F620SB013	0.26	J	16-Nov-99			
	F620SB014	0.18	J	16-Nov-99			
	F620SB017	0.66	J	06-Jun-01			
Calcium	F620SB008	39,600	J	15-Oct-99	NL	NL	2,080 - 52,300
	F620SB010	2,360	J	17-Nov-99			
	F620SB011	22,700	J	16-Nov-99			
	F620SB012	33,200	J	16-Nov-99			
	F620SB013	65,500	J	16-Nov-99			
	F620SB014	82,100	J	16-Nov-99			
	F620SB017	5,340	=	06-Jun-01			
	F620SB018	792	J	06-Jun-01			
Chromium ^d	F620SB008	32.8	J	15-Oct-99	210	19	6.3 - 39
	F620SB010	8	J	17-Nov-99			
	F620SB011	16.8	J	16-Nov-99			
	F620SB012	21.6	J	16-Nov-99			
	F620SB013	30.6	J	16-Nov-99			
	F620SB014	11.3	J	16-Nov-99			
	F620SB017	20.6	=	06-Jun-01			
	F620SB018	8.7	=	06-Jun-01			
Cobalt	F620SB008	3.2	J	15-Oct-99	4,700	130,000	0.94 - 36
	F620SB010	22	J	17-Nov-99			
	F620SB011	12	J	16-Nov-99			
	F620SB012	3.2	J	16-Nov-99			

TABLE 4-1

Inorganic Compounds Detected in Surface Soil; 1999 and June 2001 RFI Addendum Investigations
RFI Report Addendum and IM Completion Report, SWMU 36/AOC 620, Zone F, Charleston Naval Complex

Analyte	Sample Location	Concentration (mg/kg)	Qualifier	Date Collected	EPA Region III Residential RBC ^a	Soil-to-Groundwater SSL ^b	Range of Background Concentrations ^c
Cobalt	F620SB013	4.7	J	16-Nov-99	4,700	130,000	0.94 - 36
	F620SB014	2.2	J	16-Nov-99			
	F620SB017	1.91	J	06-Jun-01			
	F620SB018	0.78	J	06-Jun-01			
Copper	F620SB008	46	=	15-Oct-99	310	5,300 ^f	5.7 - 431
	F620SB010	4.4	=	17-Nov-99			
	F620SB011	18	J	16-Nov-99			
	F620SB012	45	J	16-Nov-99			
	F620SB013	43	J	16-Nov-99			
	F620SB014	45	J	16-Nov-99			
	F620SB017	31.1	J	06-Jun-01			
	F620SB018	10.2	J	06-Jun-01			
Iron	F620SB008	8,790	=	15-Oct-99	2,300	NL	3,570 - 32,700
	F620SB010	4,780	J	17-Nov-99			
	F620SB011	8,400	J	16-Nov-99			
	F620SB012	17,300	J	16-Nov-99			
	F620SB013	15,700	J	16-Nov-99			
	F620SB014	4,280	J	16-Nov-99			
	F620SB017	8,120	=	06-Jun-01			
	F620SB018	2,650	=	06-Jun-01			
Lead	F620SB008	89	=	15-Oct-99	400 ^g	400	3.5 - 275
	F620SB010	98	J	17-Nov-99			
	F620SB011	27	J	16-Nov-99			
	F620SB012	61	J	16-Nov-99			
	F620SB013	78	J	16-Nov-99			
	F620SB014	44	J	16-Nov-99			
	F620SB017	172	=	06-Jun-01			
	F620SB018	18,400	=	06-Jun-01			

TABLE 4-1

Inorganic Compounds Detected in Surface Soil; 1999 and June 2001 RFI Addendum Investigations
RFI Report Addendum and IM Completion Report, SWMU 36/AOC 620, Zone F, Charleston Naval Complex

Analyte	Sample Location	Concentration (mg/kg)	Qualifier	Date Collected	EPA Region III Residential RBC ^a	Soil-to-Groundwater SSL ^b	Range of Background Concentrations ^c
Magnesium	F620SB008	1,310	J	15-Oct-99	NL	NL	323 - 5,280
	F620SB010	418	J	17-Nov-99			
	F620SB011	1,310	J	16-Nov-99			
	F620SB012	1,410	J	16-Nov-99			
	F620SB013	2,460	J	16-Nov-99			
	F620SB014	2,190	J	16-Nov-99			
	F620SB017	630	J	06-Jun-01			
	F620SB018	195	J	06-Jun-01			
Manganese	F620SB008	110	=	15-Oct-99	160	480 ^f	32 - 436
	F620SB010	30	J	17-Nov-99			
	F620SB011	100	J	16-Nov-99			
	F620SB012	189	J	16-Nov-99			
	F620SB013	239	J	16-Nov-99			
	F620SB014	84	J	16-Nov-99			
	F620SB017	83.9	J	06-Jun-01			
	F620SB018	9.95	J	06-Jun-01			
Mercury	F620SB008	0.38	=	15-Oct-99	2.3	1	0.06 - 2
	F620SB010	0.05	J	17-Nov-99			
	F620SB011	0.05	J	16-Nov-99			
	F620SB012	0.2	J	16-Nov-99			
	F620SB013	0.22	J	16-Nov-99			
	F620SB017	3.78	=	06-Jun-01			
	F620SB018	5.05	=	06-Jun-01			
Nickel	F620SB008	11.4	=	15-Oct-99	160	65	2 - 27
	F620SB010	6.2	J	17-Nov-99			
	F620SB011	6.8	J	16-Nov-99			
	F620SB012	8.3	J	16-Nov-99			
	F620SB013	13.2	J	16-Nov-99			
	F620SB014	6.7	J	16-Nov-99			

TABLE 4-1

Inorganic Compounds Detected in Surface Soil; 1999 and June 2001 RFI Addendum Investigations
RFI Report Addendum and IM Completion Report, SWMU 36/AOC 620, Zone F, Charleston Naval Complex

Analyte	Sample Location	Concentration (mg/kg)	Qualifier	Date Collected	EPA Region III Residential RBC ^a	Soil-to-Groundwater SSL ^b	Range of Background Concentrations ^c
Nickel	F620SB017	6.52	J	06-Jun-01	160	65	2 - 27
	F620SB018	4.23	J	06-Jun-01			
Potassium	F620SB008	698	J	15-Oct-99	NL	NL	202 - 1,730
	F620SB010	215	J	17-Nov-99			
	F620SB011	744	J	16-Nov-99			
	F620SB012	722	J	16-Nov-99			
	F620SB013	1,530	J	16-Nov-99			
	F620SB014	609	J	16-Nov-99			
	F620SB017	319	J	06-Jun-01			
	F620SB018	237	J	06-Jun-01			
Selenium	F620SB008	0.8	J	15-Oct-99	39	2.5	0.44 - 1.4
	F620SB010	0.51	J	17-Nov-99			
	F620SB011	0.57	J	16-Nov-99			
	F620SB012	0.66	J	16-Nov-99			
	F620SB013	0.73	J	16-Nov-99			
	F620SB014	0.53	J	16-Nov-99			
Silver	F620SB010	0.41	J	17-Nov-99	39	17	0.75 - 5
	F620SB018	3.55	=	06-Jun-01			
Sodium	F620SB008	270	J	15-Oct-99	NL	NL	226 - 1,150
	F620SB010	99.2	J	17-Nov-99			
	F620SB011	219	J	16-Nov-99			
	F620SB012	236	J	16-Nov-99			
	F620SB013	297	J	16-Nov-99			
	F620SB014	224	J	16-Nov-99			
	F620SB018	22.9	J	06-Jun-01			
Tin	F620SB008	7.3	J	15-Oct-99	4,700	NL	2.6 - 26
Vanadium	F620SB008	17.5	=	15-Oct-99	55	3,000	6.8 - 60
	F620SB010	23.6	J	17-Nov-99			

TABLE 4-1
 Inorganic Compounds Detected in Surface Soil; 1999 and June 2001 RFI Addendum Investigations
RFI Report Addendum and IM Completion Report, SWMU 36/AOC 620, Zone F, Charleston Naval Complex

Analyte	Sample Location	Concentration (mg/kg)	Qualifier	Date Collected	EPA Region III Residential RBC ^a	Soil-to-Groundwater SSL ^b	Range of Background Concentrations ^c
Vanadium	F620SB011	18.2	J	16-Nov-99	55	3,000	6.8 - 60
	F620SB012	17.4	J	16-Nov-99			
	F620SB013	31.5	J	16-Nov-99			
	F620SB014	10.7	J	16-Nov-99			
	F620SB017	18.9	=	06-Jun-01			
	F620SB018	6.99	J	06-Jun-01			
Zinc	F620SB008	145	J	15-Oct-99	2,300	6,000	18 - 1,650
	F620SB010	150	J	17-Nov-99			
	F620SB011	69.3	J	16-Nov-99			
	F620SB012	159	J	16-Nov-99			
	F620SB013	173	J	16-Nov-99			
	F620SB014	32.1	J	16-Nov-99			
	F620SB017	213	=	06-Jun-01			
	F620SB018	27.4	=	06-Jun-01			

Concentrations in bold and outlined within the table indicate an exceedance of screening criteria.

^aResidential risk-based concentrations (RBCs) obtained from the EPA Region III, RBC Table (October 2000). A hazard index (HI)=0.1 is used for non-carcinogenic compounds.

^bGeneric soil screening levels (SSLs) from EPA's *Soil Screening Guidance: Technical Background Document*, Appendix A, Table A-1 (1996), using a dilution attenuation factor (DAF)=10.

^cSurface soil background range values are the minimum and maximum concentrations detected in Zones F and G combined grid samples.

^dTotal chromium

^eDefault lead SSL = 400 mg/kg

^fSSL for copper and manganese from EPA Region III RBC table, October 2000.

= Chemical was detected at the concentration shown.

J Chemical was detected at concentration below the method detection limit; the concentration is not known.

mg/kg Milligrams per kilogram

NA Not available

NL Not listed

TABLE 4-2

Organic Compounds Detected in Surface Soil; 1999 and June 2001 RFI Addendum Investigations
 RFI Report Addendum and IM Completion Report, SWMU 36/AOC 620, Zone F, Charleston Naval Complex

Analyte	Sample Location	Concentration (mg/kg)	Qualifier	Date Collected	EPA Region III Residential RBC ^a	Soil-to-Groundwater SSL ^b	Background Reference Concentration ^c
Acetone	F620SB017	0.034	J	06-Jun-01	780	0.8	NA
	F620SB018	0.015	J	06-Jun-01			
2-Methylnaphthalene	F620SB014	0.2	J	15-Oct-99	160	11 ^d	NA
Alpha-chlordane ^e	F620SB008	0.008	J	15-Oct-99	1.8	5	NA
BEQs	F620SB008	0.347	=	15-Oct-99	NA	NA	1.304
	F620SB013	0.373	=	15-Oct-99			
	F620SB017	1.683	=	06-Jun-01			
	F620SB018	1.023	=	06-Jun-01			
Benzene	F620SB017	0.001	J	06-Jun-01	12	0.015	NA
Benzo[a]Anthracene	F620SB008	0.078	J	15-Oct-99	0.87	1	0.616
	F620SB013	0.099	J	15-Oct-99			
	F620SB017	0.038	J	06-Jun-01			
	F620SB018	0.112	J	06-Jun-01			
Benzo[a]Pyrene	F620SB008	0.12	J	15-Oct-99	0.087	4	0.598
	F620SB013	0.12	J	15-Oct-99			
	F620SB018	0.093	J	06-Jun-01			
Benzo[b]Fluoranthene	F620SB008	0.19	J	15-Oct-99	0.87	2.5	0.608
	F620SB013	0.16	J	15-Oct-99			
	F620SB017	1.04	J	06-Jun-01			
	F620SB018	1.15	J	06-Jun-01			
Benzo[g,h,i]Perylene	F620SB008	0.13	J	15-Oct-99	NL	NL	NA
	F620SB018	0.073	J	06-Jun-01			
Benzo[k]Fluoranthene	F620SB008	0.13	J	15-Oct-99	8.7	25	0.596
	F620SB013	0.14	J	15-Oct-99			
	F620SB017	0.035	J	06-Jun-01			
	F620SB018	0.136	J	06-Jun-01			

TABLE 4-2

Organic Compounds Detected in Surface Soil; 1999 and June 2001 RFI Addendum Investigations
 RFI Report Addendum and IM Completion Report, SWMU 36/AOC 620, Zone F, Charleston Naval Complex

Analyte	Sample Location	Concentration (mg/kg)	Qualifier	Date Collected	EPA Region III Residential RBC ^a	Soil-to-Groundwater SSL ^b	Background Reference Concentration ^c
bis(2-Ethylhexyl) Phthalate	F620SB014	0.12	J	15-Oct-99	46	1,800	NA
Chrysene	F620SB008	0.11	J	15-Oct-99	87	80	0.62
	F620SB013	0.13	J	15-Oct-99			
	F620SB017	0.043	J	06-Jun-01			
	F620SB018	0.127	J	06-Jun-01			
Di-n-butyl Phthalate	F620SB008	0.29	J	15-Oct-99	780	1,200	NA
Di-n-octyl Phthalate	F620SB014	1.1	=	15-Oct-99	160	5,000	NA
Fluoranthene	F620SB008	0.12	J	15-Oct-99	310	2,200	NA
	F620SB013	0.16	J	15-Oct-99			
	F620SB017	0.058	J	06-Jun-01			
	F620SB018	0.114	J	06-Jun-01			
Gamma-chlordane ^e	F620SB008	0.011	J	15-Oct-99	1.8	5.0	NA
Indeno[1,2,3-c,d]Pyrene	F620SB008	0.14	J	15-Oct-99	0.87	7.0	0.525
	F620SB018	0.0705	J	06-Jun-01			
Methyl ethyl ketone	F620SB017	0.016	J	06-Jun-01	4,700	0.4 ^d	NA
Naphthalene	F620SB014	0.13	J	15-Oct-99	160	4.0	NA
p,p'-DDE	F620SB008	0.053	J	15-Oct-99	1.9	27	NA
Aroclor-1254	F620SB016	0.233	=	06-Jun-01	0.32	0.55 ^d	NA
	F620SB019	1.12	=	06-Jun-01			
	F620SB021	0.46	=	06-Jun-01			
Aroclor-1260	F620SB008	0.088	=	15-Oct-99	0.32	NL	NA
	F620SB016	0.046	J	06-Jun-01			
	F620SB019	0.293	=	06-Jun-01			
	F620SB021	0.117	=	06-Jun-01			

TABLE 4-2

Organic Compounds Detected in Surface Soil; 1999 and June 2001 RFI Addendum Investigations
 RFI Report Addendum and IM Completion Report, SWMU 36/AOC 620, Zone F, Charleston Naval Complex

Analyte	Sample Location	Concentration (mg/kg)	Qualifier	Date Collected	EPA Region III Residential RBC ^a	Soil-to-Groundwater SSL ^b	Background Reference Concentration ^c
Phenanthrene	F620SB008	0.094	J	15-Oct-99	NL	NL	NA
	F620SB014	0.089	J	15-Oct-99			
Pyrene	F620SB008	0.12	J	15-Oct-99	230	2,100	NA
	F620SB013	0.2	J	15-Oct-99			
	F620SB017	0.059	J	06-Jun-01			
	F620SB018	0.132	J	06-Jun-01			
Toluene	F620SB008	0.004	=	15-Oct-99	1,600	6	NA

Concentrations in bold and outlined within the table indicate an exceedance of screening criteria.

^a Residential land use risk-based concentrations (RBCs) obtained from the EPA Region III, RBC Table (October 2000); hazard index (HI)=0.1 used for non-carcinogenic compounds.

^b Soil screening levels (SSLs) from EPA's *Soil Screening Guidance: Technical Background Document*, Appendix A, Table A-1 (1996); dilution attenuation factor (DAF)=1 for volatile organic compounds (VOCs) listed in italics, DAF = 10 for all other parameters.

^c Sitewide background concentration for subsurface soil taken from *Background PAHs Study Report: Technical Information for the Development of Background BEQ Values* (CH2M-Jones, 2001b).

^d SSLs for 2-Methylnaphthalene, Methyl ethyl ketone, and Aroclor-1254 are from EPA Region III RBC table (October 2000).

^e No RBC/SSL data available, values for chlordane used.

= Chemical was detected at the concentration shown.

J Chemical was detected at concentration below the method detection limit; the concentration is not known.

mg/kg Milligrams per kilogram

NA Not available

NL Not listed

TABLE 4-3

Inorganic Compounds Detected in Subsurface Soil; 1999 and June 2001 RFI Addendum Investigations
RFI Report Addendum and IM Completion Report, SWMU 36/AOC 620, Zone F, Charleston Naval Complex

Analyte	Sample Location	Concentration (mg/kg)	Qualifier	Date Collected	Soil-to-Groundwater SSL ^a	Range of Background Concentrations ^b
Aluminum	F620SB008	16,000	=	15-Oct-99	NL	2,630 - 36,800
	F620SB010	5,970	J	17-Nov-99		
	F620SB011	4,740	J	16-Nov-99		
	F620SB012	15,400	J	16-Nov-99		
	F620SB013	18,200	J	16-Nov-99		
	F620SB014	7,150	J	16-Nov-99		
	F620SB017	24,700	=	06-Jun-01		
	F620SB018	15,300	=	06-Jun-01		
Antimony	F620SB008	2.5	J	15-Oct-99	2.5	NA
	F620SB017	1.11	J	06-Jun-01		
	F620SB018	2.09	J	06-Jun-01		
Arsenic	F620SB008	18.9	=	15-Oct-99	15	1.4 - 36
	F620SB010	1.1	J	17-Nov-99		
	F620SB011	2.9	J	16-Nov-99		
	F620SB012	16.1	J	16-Nov-99		
	F620SB013	14.2	J	16-Nov-99		
	F620SB014	6.3	J	16-Nov-99		
	F620SB017	22	=	06-Jun-01		
	F620SB018	13.8	=	06-Jun-01		
Barium	F620SB008	139	=	15-Oct-99	800	7.7 - 63
	F620SB010	12.8	J	17-Nov-99		
	F620SB011	11.5	J	16-Nov-99		
	F620SB012	44.3	J	16-Nov-99		
	F620SB013	37.5	J	16-Nov-99		
	F620SB014	16.5	J	16-Nov-99		
	F620SB017	38.8	J	06-Jun-01		
	F620SB018	48.1	J	06-Jun-01		
Beryllium	F620SB008	0.47	J	15-Oct-99	32	0.22 - 2.4
	F620SB010	0.16	J	17-Nov-99		

TABLE 4-3

Inorganic Compounds Detected in Subsurface Soil; 1999 and June 2001 RFI Addendum Investigations
RFI Report Addendum and IM Completion Report, SWMU 36/AOC 620, Zone F, Charleston Naval Complex

Analyte	Sample Location	Concentration (mg/kg)	Qualifier	Date Collected	Soil-to-Groundwater SSL ^a	Range of Background Concentrations ^b
Beryllium	F620SB011	0.19	J	16-Nov-99	32	0.22 - 2.4
	F620SB012	1.1	=	16-Nov-99		
	F620SB013	1	=	16-Nov-99		
	F620SB014	0.31	J	16-Nov-99		
	F620SB017	1.06	J	06-Jun-01		
	F620SB018	0.26	J	06-Jun-01		
Cadmium	F620SB008	0.43	J	15-Oct-99	4	0.08 - 0.52
	F620SB013	0.13	J	16-Nov-99		
	F620SB017	1.12	J	06-Jun-01		
Calcium	F620SB008	14,000	J	15-Oct-99	NL	1,040 - 127,000
	F620SB010	568	J	17-Nov-99		
	F620SB011	2,030	J	16-Nov-99		
	F620SB012	7,030	J	16-Nov-99		
	F620SB013	42,700	J	16-Nov-99		
	F620SB014	13,500	J	16-Nov-99		
	F620SB017	8,710	=	06-Jun-01		
	F620SB018	588	J	06-Jun-01		
Chromium ^c	F620SB008	269	J	15-Oct-99	19	7.4 - 65
	F620SB010	6.4	J	17-Nov-99		
	F620SB011	12.9	J	16-Nov-99		
	F620SB012	48.8	J	16-Nov-99		
	F620SB013	42.8	J	16-Nov-99		
	F620SB014	13	J	16-Nov-99		
	F620SB017	44.0	=	06-Jun-01		
	F620SB018	31.5	=	06-Jun-01		
Cobalt	F620SB008	4.8	J	15-Oct-99	130,000	0.9 - 15
	F620SB010	0.91	J	17-Nov-99		
	F620SB011	1.6	J	16-Nov-99		
	F620SB012	6.7	J	16-Nov-99		

TABLE 4-3

Inorganic Compounds Detected in Subsurface Soil; 1999 and June 2001 RFI Addendum Investigations
RFI Report Addendum and IM Completion Report, SWMU 36/AOC 620, Zone F, Charleston Naval Complex

Analyte	Sample Location	Concentration (mg/kg)	Qualifier	Date Collected	Soil-to-Groundwater SSL ^a	Range of Background Concentrations ^b
Cobalt	F620SB013	6.8	J	16-Nov-99	130,000	0.9 - 15
	F620SB014	2.4	J	16-Nov-99		
	F620SB017	8.1	J	06-Jun-01		
	F620SB018	2.39	J	06-Jun-01		
Copper	F620SB008	66.8	J	15-Oct-99	5,300 ^d	2.5 - 55
	F620SB010	1.1	J	17-Nov-99		
	F620SB011	7.7	J	16-Nov-99		
	F620SB012	49.2	J	16-Nov-99		
	F620SB013	52.1	J	16-Nov-99		
	F620SB014	14	J	16-Nov-99		
	F620SB017	57.5	J	06-Jun-01		
	F620SB018	35.2	J	06-Jun-01		
Iron	F620SB008	19,200	J	15-Oct-99	NL	3,110 - 58,100
	F620SB010	2,070	J	17-Nov-99		
	F620SB011	4,440	J	16-Nov-99		
	F620SB012	23,700	J	16-Nov-99		
	F620SB013	24,500	J	16-Nov-99		
	F620SB014	8,210	J	16-Nov-99		
	F620SB017	27,700	=	06-Jun-01		
	F620SB018	17,500	=	06-Jun-01		
Lead	F620SB008	105	J	15-Oct-99	400 ^e	2.4 - 123
	F620SB010	4.9	J	17-Nov-99		
	F620SB011	18.2	J	16-Nov-99		
	F620SB012	82.8	J	16-Nov-99		
	F620SB013	88.3	J	16-Nov-99		
	F620SB014	27.9	J	16-Nov-99		
	F620SB017	236	=	06-Jun-01		
	F620SB018	1,350	=	06-Jun-01		

TABLE 4-3

Inorganic Compounds Detected in Subsurface Soil; 1999 and June 2001 RFI Addendum Investigations
RFI Report Addendum and IM Completion Report, SWMU 36/AOC 620, Zone F, Charleston Naval Complex

Analyte	Sample Location	Concentration (mg/kg)	Qualifier	Date Collected	Soil-to-Groundwater SSL ^a	Range of Background Concentrations ^b
Magnesium	F620SB008	2,220	J	15-Oct-99	NL	399 - 7,040
	F620SB010	296	J	17-Nov-99		
	F620SB011	560	J	16-Nov-99		
	F620SB012	3,210	J	16-Nov-99		
	F620SB013	3,360	J	16-Nov-99		
	F620SB014	930	J	16-Nov-99		
	F620SB017	2,510	J	06-Jun-01		
	F620SB018	1,140	J	06-Jun-01		
Manganese	F620SB008	401	J	15-Oct-99	480 ^d	20 - 1,120
	F620SB010	17	J	17-Nov-99		
	F620SB011	51.3	J	16-Nov-99		
	F620SB012	302	J	16-Nov-99		
	F620SB013	323	J	16-Nov-99		
	F620SB014	121	J	16-Nov-99		
	F620SB017	400	J	06-Jun-01		
	F620SB018	23.9	J	06-Jun-01		
Mercury	F620SB008	0.7	=	15-Oct-99	1	0.04 - 0.57
	F620SB011	0.07	J	16-Nov-99		
	F620SB012	0.27	J	16-Nov-99		
	F620SB013	0.35	J	16-Nov-99		
	F620SB014	0.07	J	16-Nov-99		
	F620SB017	4.32	=	06-Jun-01		
	F620SB018	3.48	=	06-Jun-01		
Nickel	F620SB008	9.9	J	15-Oct-99	65	1.9 - 22
	F620SB010	1.8	J	17-Nov-99		
	F620SB011	4.3	J	16-Nov-99		
	F620SB012	16.9	J	16-Nov-99		
	F620SB013	18.7	J	16-Nov-99		
	F620SB014	5.3	J	16-Nov-99		

TABLE 4-3

Inorganic Compounds Detected in Subsurface Soil; 1999 and June 2001 RFI Addendum Investigations
RFI Report Addendum and IM Completion Report, SWMU 36/AOC 620, Zone F, Charleston Naval Complex

Analyte	Sample Location	Concentration (mg/kg)	Qualifier	Date Collected	Soil-to-Groundwater SSL ^a	Range of Background Concentrations ^b
Nickel	F620SB017	16.8	=	06-Jun-01	65	1.9 - 22
	F620SB018	5.6	J	06-Jun-01		
Potassium	F620SB008	1,390	J	15-Oct-99	NL	195 - 3,790
	F620SB010	152	J	17-Nov-99		
	F620SB011	259	J	16-Nov-99		
	F620SB012	1,670	J	16-Nov-99		
	F620SB013	1,930	J	16-Nov-99		
	F620SB014	439	J	16-Nov-99		
	F620SB017	1,230	J	06-Jun-01		
	F620SB018	1,500	J	06-Jun-01		
Selenium	F620SB008	1.7	=	15-Oct-99	2.5	0.4 - 1.7
	F620SB010	0.35	J	17-Nov-99		
	F620SB011	0.45	J	16-Nov-99		
	F620SB012	1.7	J	16-Nov-99		
	F620SB013	1.1	J	16-Nov-99		
	F620SB014	0.72	J	16-Nov-99		
	F620SB017	1.01	J	06-Jun-01		
	F620SB018	0.53	J	06-Jun-01		
Sodium	F620SB008	325	J	15-Oct-99	NL	289 - 3,890
	F620SB010	132	J	17-Nov-99		
	F620SB011	118	J	16-Nov-99		
	F620SB012	318	J	16-Nov-99		
	F620SB013	368	J	16-Nov-99		
	F620SB014	114	J	16-Nov-99		
	F620SB017	128	J	06-Jun-01		
	F620SB018	269	J	06-Jun-01		
Vanadium	F620SB008	36.4	=	15-Oct-99	3,000	5.9 - 112
	F620SB010	4.4	J	17-Nov-99		
	F620SB011	9.1	J	16-Nov-99		

TABLE 4-3

Inorganic Compounds Detected in Subsurface Soil; 1999 and June 2001 RFI Addendum Investigations
RFI Report Addendum and IM Completion Report, SWMU 36/AOC 620, Zone F, Charleston Naval Complex

Analyte	Sample Location	Concentration (mg/kg)	Qualifier	Date Collected	Soil-to-Groundwater SSL ^a	Range of Background Concentrations ^b
Vanadium	F620SB012	46.4	J	16-Nov-99	3,000	5.9 - 112
	F620SB013	43	J	16-Nov-99		
	F620SB014	16.8	J	16-Nov-99		
	F620SB017	54	=	06-Jun-01		
	F620SB018	25.7	=	06-Jun-01		
Zinc	F620SB008	422	J	15-Oct-99	6,000	9.3 - 198
	F620SB010	5.2	J	17-Nov-99		
	F620SB011	44.8	J	16-Nov-99		
	F620SB012	209	J	16-Nov-99		
	F620SB013	214	J	16-Nov-99		
	F620SB014	49	J	16-Nov-99		
	F620SB017	457	=	06-Jun-01		
	F620SB018	11.6	=	06-Jun-01		

Concentrations in bold and outlined within the table indicate an exceedance of screening criteria.

^aGeneric soil screening levels (SSLs) from EPA's *Soil Screening Guidance: Technical Background Document*, Appendix A, Table A-1 (1996), using a dilution attenuation factor (DAF)=10.

^bBackground range values are the minimum and maximum concentrations detected in Zones F and G combined grid samples.

^cTotal chromium

^dSSL for copper and manganese from EPA Region III RBC table, October 2000.

^eDefault lead SSL = 400 mg/kg.

= Chemical was detected at the concentration shown.

J Chemical was detected at concentration below the method detection limit; the concentration is not known.

mg/kg Milligrams per kilogram

NA Not available

NL Not listed

TABLE 4-4

Organic Compounds Detected in Subsurface Soil; 1999 and June 2001 RFI Addendum Investigations
RFI Report Addendum and IM Completion Report, SWMU 36/AOC 620, Zone F, Charleston Naval Complex

Analyte	Sample Location	Concentration (mg/kg)	Qualifier	Date Collected	SSL ^a	Background Reference Concentration ^b
Acenaphthene	F620SB008	0.71	=	15-Oct-99	290	NA
	F620SB018	0.006	J	06-Jun-01		
Acetone	F620SB017	0.063	J	06-Jun-01	0.8	NA
	F620SB018	0.109	J	06-Jun-01		
Alpha-chlordane	F620SB008	0.008	=	15-Oct-99	5	NA
BEQs	F620SB008	0.401	=	15-Oct-99	NA	1.4
	F620SB013	0.45	=	15-Oct-99		
	F620SB014	0.429	=	15-Oct-99		
	F620SB017	0.397	=	06-Jun-01		
	F620SB018	0.341	=	06-Jun-01		
Benzo[a]Anthracene	F620SB013	0.15	J	15-Oct-99	1	NA
	F620SB017	0.032	J	06-Jun-01		
	F620SB018	0.032	J	06-Jun-01		
Benzo[a]Pyrene	F620SB008	0.1	J	15-Oct-99	4	0.623
	F620SB013	0.16	J	15-Oct-99		
	F620SB017	0.034	J	06-Jun-01		
	F620SB018	0.031	J	06-Jun-01		
Benzo[b]Fluoranthene	F620SB008	0.12	J	15-Oct-99	2.5	0.631
	F620SB013	0.22	J	15-Oct-99		
	F620SB014	0.092	J	15-Oct-99		
	F620SB017	0.389	J	06-Jun-01		
	F620SB018	0.375	J	06-Jun-01		
Benzo[k]Fluoranthene	F620SB008	0.097	J	15-Oct-99	25	0.609
	F620SB013	0.18	J	15-Oct-99		
	F620SB017	0.032	J	06-Jun-01		
	F620SB018	0.03	J	06-Jun-01		
Benzo[g,h,i]Perylene	F620SB017	0.025	J	06-Jun-01	NL	NA
	F620SB018	0.019	J	06-Jun-01		

TABLE 4-4

Organic Compounds Detected in Subsurface Soil; 1999 and June 2001 RFI Addendum Investigations
RFI Report Addendum and IM Completion Report, SWMU 36/AOC 620, Zone F, Charleston Naval Complex

Analyte	Sample Location	Concentration (mg/kg)	Qualifier	Date Collected	SSL ^a	Background Reference Concentration ^b
Carbon Disulfide	F620SB008	0.004	J	15-Oct-99	2	NA
	F620SB017	0.029	=	06-Jun-01		
	F620SB018	0.022	=	06-Jun-01		
Chrysene	F620SB008	0.095	J	15-Oct-99	80	0.616
	F620SB013	0.21	J	15-Oct-99		
	F620SB017	0.033	J	06-Jun-01		
	F620SB018	0.024	J	06-Jun-01		
Dibenzofuran	F620SB008	0.12	J	15-Oct-99	3.9 ^d	NA
Fluoranthene	F620SB008	0.15	J	15-Oct-99	2,200	NA
	F620SB013	0.36	J	15-Oct-99		
	F620SB017	0.036	J	06-Jun-01		
	F620SB018	0.021	J	06-Jun-01		
Gamma-chlordane ^c	F620SB008	0.01	=	15-Oct-99	5	NA
Indeno[1,2,3-c,d]Pyrene	F620SB013	0.11	J	15-Oct-99	7	NA
	F620SB018	0.02	J	06-Jun-01		
Methyl ethyl ketone	F620SB008	0.002	J	15-Oct-99	0.4 ^d	NA
	F620SB017	0.023	J	06-Jun-01		
Aroclor-1254	F620SB019	0.253	=	06-Jun-01	0.55 ^d	NA
	F620SB020	0.009	J	06-Jun-01		
Aroclor-1260	F620SB019	0.043	J	06-Jun-01	NL	NA
	F620SB021	0.016	J	06-Jun-01		
p,p'-DDE	F620SB008	0.011	=	15-Oct-99	27	NA
Phenanthrene	F620SB013	0.11	J	15-Oct-99	NL	NA
	F620SB017	0.013	J	06-Jun-01		
Pyrene	F620SB008	0.15	J	15-Oct-99	2,100	NA
	F620SB013	0.35	J	15-Oct-99		

TABLE 4-4

Organic Compounds Detected in Subsurface Soil; 1999 and June 2001 RFI Addendum Investigations
RFI Report Addendum and IM Completion Report, SWMU 36/AOC 620, Zone F, Charleston Naval Complex

Analyte	Sample Location	Concentration (mg/kg)	Qualifier	Date Collected	SSL ^a	Background Reference Concentration ^b
Pyrene	F620SB017	0.041	J	06-Jun-01	2,100	NA
	F620SB018	0.027	J	06-Jun-01		

^aSoil screening levels (SSLs) from EPA's *Soil Screening Guidance: Technical Background Document*, Appendix A, Table A-1; dilution attenuation factor (DAF)=1 for volatile organic compounds (VOCs) listed in italics; DAF=10 for all other parameters.

^bSitewide background concentration for subsurface soil taken from *Background PAHs Study Report: Technical Information for the development of Background BEQ Values* (CH2M-Jones, 2001b).

^cNo risk-based concentration (RBC)/SSL data available, values for chlordane used.

^dSSLs for dibenzofuran, methyl ethyl ketone, and Aroclor-1254 are from EPA Region III RBC table (October 2000).

= Chemical was detected at the concentration shown.

J Chemical was detected at concentration below the method detection limit; the concentration is not known.

mg/kg Milligrams per kilogram

NA Not available

NL Not listed

TABLE 4-5

Results from Surface Soil Pre-Excavation and Post-Demolition IM Sampling
 RFI Report Addendum and IM Completion Report, SWMU 36/AOC 620, Zone F, Charleston Naval Complex

Analyte	Sample Location	Date Collected	Concentration (mg/kg)	Qualifier	SPLP (µg/L)	Qualifier	TCLP (µg/L)	Qualifier	EPA Region III RBC ^a (mg/kg)	SSL ^b (mg/kg)	Zones F and G Background Range ^c (mg/kg)
Lead	F620SB022	10/10/2001	25.4	=					400 ^b	400 ^c	3.5 - 275
	F620SB023	10/10/2001	5.91	=					400	400	3.5 - 275
	F620SB024	10/10/2001	4.03	=					400	400	3.5 - 275
	F620SB025	10/10/2001	5.82	=					400	400	3.5 - 275
	F620SB026	10/10/2001	4.92	=					400	400	3.5 - 275
	F620SB027	10/10/2001	5.17	=					400	400	3.5 - 275
	F620SB028	10/10/2001	4.67	=					400	400	3.5 - 275
	F620SB029	10/10/2001	71.6	=					400	400	3.5 - 275
	F620SB030	10/10/2001	476	=					400	400	3.5 - 275
	F620SB031	10/10/2001	273	=					400	400	3.5 - 275
	F620SB032	10/10/2001	1,500	=	1,730	=			400	400	3.5 - 275
	F620SB033	10/10/2001	430	=					400	400	3.5 - 275
	F620SB034	10/10/2001	106	=					400	400	3.5 - 275
	F620SB035	10/10/2001	770	=	40.4	=			400	400	3.5 - 275
	F620SB036	10/10/2001	570	=					400	400	3.5 - 275
	F620SB037	10/10/2001	2,350	=					400	400	3.5 - 275
	F620SB038	10/10/2001	952	=					400	400	3.5 - 275
	F620SB039	10/10/2001	145	=					400	400	3.5 - 275

TABLE 4-5
 Results from Surface Soil Pre-Excavation and Post-Demolition IM Sampling
 RFI Report Addendum and IM Completion Report, SWMU 36/AOC 620, Zone F, Charleston Naval Complex

Analyte	Sample Location	Date Collected	Concentration (mg/kg)	Qualifier	SPLP (µg/L)	Qualifier	TCLP (µg/L)	Qualifier	EPA Region III RBC ^a (mg/kg)	SSL ^b (mg/kg)	Zones F and G Background Range ^c (mg/kg)
Lead	F620SB040	10/10/2001	93.5	=					400 ^b	400 ^c	3.5 - 275
	F620SB041	10/10/2001	736	=					400	400	3.5 - 275
	F620SB042	10/10/2001	2.81	=					400	400	3.5 - 275
	F620SB043	10/10/2001	632	=	61.1	J			400	400	3.5 - 275
	F620SB044	10/10/2001	224	=					400	400	3.5 - 275
	F620SB045	10/10/2001	239	=					400	400	3.5 - 275
	F620SB046	10/10/2001	195	=					400	400	3.5 - 275
	F620SB053	11/26/2001	153	=	33.4	J			400	400	3.5 - 275
	F620SB054	11/26/2001	1,820	=			31,200	=	400	400	3.5 - 275
	F620SB055	11/26/2001	3.05	=	24.8	J			400	400	3.5 - 275
	F620SB056	11/26/2001	2.67	=	17.2	U			400	400	3.5 - 275
	F620SB057	11/26/2001	790	=			273	=	400	400	3.5 - 275
	F620SB059	11/26/2001	NA				17.2	U	NA	NA	NA
	F620SB060	11/26/2001	406	=					400	400	3.5 - 275
	F620SB061	02/07/2002	39.0	=					400	400	3.5 - 275
	F620SB062	02/07/2002	94.0	=					400	400	3.5 - 275
	F620SB063	02/07/2002	70.5	=					400	400	3.5 - 275
	F620SB064	02/07/2002	209	=					400	400	3.5 - 275

TABLE 4-5
 Results from Surface Soil Pre-Excavation and Post-Demolition IM Sampling
 RFI Report Addendum and IM Completion Report, SWMU 36/AOC 620, Zone F, Charleston Naval Complex

Analyte	Sample Location	Date Collected	Concentration (mg/kg)	Qualifier	SPLP (µg/L)	Qualifier	TCLP (µg/L)	Qualifier	EPA Region III RBC ^a (mg/kg)	SSL ^b (mg/kg)	Zones F and G Background Range ^c (mg/kg)
Lead	F620SB065	02/07/2002	3.26	=					400 ^b	400 ^c	3.5 - 275
	F620SB066	02/07/2002	5.94	=					400	400	3.5 - 275
	F620SB067	02/07/2002	4.18	=					400	400	3.5 - 275
	620SB068	11/22/2002	110	J					400	400	3.5 - 275
	620SB069	11/22/2002	160	J					400	400	3.5 - 275
	620SB070	11/22/2002	180	J					400	400	3.5 - 275
	620SB071	11/22/2002	1,100	J					400	400	3.5 - 275
	620CB071	11/22/2002	140	J					400	400	3.5 - 275
	(duplicate)										
	620SB072	12/02/2002	156	=					400	400	3.5 - 275
	620SB073	01/08/2003	111	=					400	400	3.5 - 275
	620SB074	01/08/2003	1,410	=					400	400	3.5 - 275
	620SB075	01/08/2003	193	=					400	400	3.5 - 275
	620SB076	01/08/2003	419	=					400	400	3.5 - 275
Mercury	F620SB022	10/10/2001	0.0659	J					2.3 ^d	1 ^e	0.06 - 2
	F620SB023	10/10/2001	0.031	J					2.3	1	0.06 - 2
	F620SB029	10/10/2001	0.0342	J					2.3	1	0.06 - 2
	F620SB030	10/10/2001	1.68	=	0.73	U			2.3	1	0.06 - 2

TABLE 4-5
 Results from Surface Soil Pre-Excavation and Post-Demolition IM Sampling
 RFI Report Addendum and IM Completion Report, SWMU 36/AOC 620, Zone F, Charleston Naval Complex

Analyte	Sample Location	Date Collected	Concentration (mg/kg)	Qualifier	SPLP (µg/L)	Qualifier	TCLP (µg/L)	Qualifier	EPA Region III RBC ^a (mg/kg)	SSL ^b (mg/kg)	Zones F and G Background Range ^c (mg/kg)
Mercury	F620SB034	10/10/2001	0.361	=	0.73	U			2.3 ^d	1 ^e	0.06 - 2
	F620SB053	11/26/2001	1.06	=					2.3	1	0.06 - 2

Concentrations in bold and outlined within the table indicate an exceedance of screening criteria.

^aEPA Region III risk-based concentration (RBC) for lead is for unrestricted (i.e., residential) land use, assumed EPA Region IV value, unless otherwise indicated.

^bSoil screening level (SSL) for lead is assumed generic value, unless otherwise indicated.

^cBackground Range are the concentrations of combined Zone F and G grid samples.

^dMercury RBC is for mercuric chloride as listed in EPA Region III RBC table, October 2000, adjusted for hazard index (HI)=0.1 for unrestricted land use.

^eMercury SSL from EPA's *Soil Screening Guidance: Technical Background Document*, Appendix A, Table A-1; dilution attenuation factor (DAF)=10.

= Chemical was detected at the concentration shown.

J Chemical was detected at concentration below the method detection limit; the concentration is not known.

mg/kg Milligrams per kilogram

µg/L Micrograms per liter

NA Not analyzed/not available

SPLP Synthetic precipitation leaching procedure

TCLP Toxicity characteristic leaching procedure

U Chemical was not detected; the detection limit is shown.

TABLE 4-6
 Results from Subsurface Soil Pre-Excavation and Post-Demolition IM Sampling
RFI Report Addendum and IM Completion Report, SWMU 36/AOC 620, Zone F, Charleston Naval Complex

Analyte	Sample Location	Sample Depth (ft bls)	Concentration (mg/kg)	Qualifier	SPLP (µg/L)	Qualifier	TCLP (µg/L)	Qualifier	Date Collected	SSL ^a (mg/kg)	Zone F and G Background Range ^b (mg/kg)
Lead	F620SB022	2 - 3	157	=					10/10/2001	400 ^b	2.4 - 123
	F620SB023	2 - 3	13.3	=					10/10/2001	400	2.4 - 123
	F620SB024	2 - 3	3.1	=					10/10/2001	400	2.4 - 123
	F620SB026	2 - 3	5.56	=					10/10/2001	400	2.4 - 123
	F620SB027	2 - 3	7.9	=					10/10/2001	400	2.4 - 123
	F620SB028	2 - 3	6.21	=					10/10/2001	400	2.4 - 123
	F620SB032	2 - 3	1,120	=					10/10/2001	400	2.4 - 123
	F620SB033	2 - 3	416	=	1,590	=			10/10/2001	400	2.4 - 123
	F620SB034	2 - 3	1,100	=	2,740	=			10/10/2001	400	2.4 - 123
	F620SB035	2 - 3	303	=					10/10/2001	400	2.4 - 123
	F620SB036	2 - 3	3,880	=	17.2	U			10/10/2001	400	2.4 - 123
	F620SB037	2 - 3	497	=	17.2	U			10/10/2001	400	2.4 - 123
	F620SB038	2 - 3	3,270	=	138	J			10/10/2001	400	2.4 - 123
	F620SB039	2 - 3	242	=					10/10/2001	400	2.4 - 123
	F620SB040	2 - 3	57.5	=					10/10/2001	400	2.4 - 123
	F620SB041	2 - 3	94.8	=					10/10/2001	400	2.4 - 123
	F620SB042	2 - 3	295	=					10/10/2001	400	2.4 - 123
	F620SB043	2 - 3	736	=					10/10/2001	400	2.4 - 123

TABLE 4-6

Results from Subsurface Soil Pre-Excavation and Post-Demolition IM Sampling
RFI Report Addendum and IM Completion Report, SWMU 36/AC 620, Zone F, Charleston Naval Complex

Analyte	Sample Location	Sample Depth (ft bls)	Concentration (mg/kg)	Qualifier	SPLP (µg/L)	Qualifier	TCLP (µg/L)	Qualifier	Date Collected	SSL ^a (mg/kg)	Zone F and G Background Range ^b (mg/kg)
Lead	F620SB044	2 - 3	376	=					10/10/2001	400	2.4 - 123
	F620SB045	2 - 3	159	=					10/10/2001	400 ^b	2.4 - 123
	F620SB046	2 - 3	137	=					10/10/2001	400	2.4 - 123
	F620SB053	2 - 3	97.8	=	26.8	J			11/26/2001	400	2.4 - 123
	F620SB054	2 - 3	961	=			743	=	11/26/2001	400	2.4 - 123
	F620SB055	2 - 3	63.1	=	28.4	J			11/26/2001	400	2.4 - 123
	F620SB056	2 - 3	2.66	=	17.2	U			11/26/2001	400	2.4 - 123
	F620SB057	2 - 3	317	=			84	J	11/26/2001	400	2.4 - 123
	F620SB058	2 - 3	NA				1,980	=	11/26/2001	NA	NA
	F620SB060	2 - 3	40.7	=					11/26/2001	400	2.4 - 123
	F620SB061	3 - 5	33.7	=					02/07/2002	400	2.4 - 123
	F620SB062	3 - 5	66.8	=					02/07/2002	400	2.4 - 123
	F620SB063	3 - 5	106	=					02/07/2002	400	2.4 - 123
	F620SB064	3 - 5	14.8	=					02/07/2002	400	2.4 - 123
	F620SB065	3 - 5	4.84	=					02/07/2002	400	2.4 - 123
	F620SB066	3 - 5	11.4	=					02/07/2002	400	2.4 - 123
	F620SB067	3 - 5	6.76	=					02/07/2002	400	2.4 - 123
	620SB073	1 - 2	395	=					01/08/2003	400	2.4 - 123
	620SB074	1 - 2	2,440	=					01/08/2003	400	2.4 - 123

TABLE 4-6
 Results from Subsurface Soil Pre-Excavation and Post-Demolition IM Sampling
 RFI Report Addendum and IM Completion Report, SWMU 36/AOC 620, Zone F, Charleston Naval Complex

Analyte	Sample Location	Sample Depth (ft bls)	Concentration (mg/kg)	Qualifier	SPLP (µg/L)	Qualifier	TCLP (µg/L)	Qualifier	Date Collected	SSL ^a (mg/kg)	Zone F and G Background Range ^b (mg/kg)
Lead	620CB074	1 - 2	396	=					01/08/2003	400	2.4 - 123
	(duplicate)										
	620SB075	1 - 2	3,760	=					01/08/2003	400 ^b	2.4 - 123
	620SB076	1 - 2	1,230	=					01/08/2003	400	2.4 - 123
Mercury	F620SB022	2 - 3	0.101	=					10/10/2001	1 ^c	0.04 - 0.57
	F620SB034	2 - 3	0.576	=	4.22	J			10/10/2001	1	0.04 - 0.57
	F620SB053	2 - 3	1.52	=					11/26/2001	1	0.04 - 0.57

Concentrations in bold and outlined within the table indicate an exceedance of screening criteria.

^aSoil screening level (SSL) for lead is assumed generic value.

^bBackground Range is concentrations of combined Zone F and G grid samples.

^cMercury SSL from EPA's *Soil Screening Guidance: Technical Background Document*, Appendix A, Table A-1; dilution attenuation factor (DAF)=10.

= Chemical was detected at the concentration shown.

ft bls Feet below land surface

J Chemical was detected at concentration below the method detection limit; the concentration is not known.

mg/kg Milligrams per kilogram

µg/L Micrograms per liter

NA Not analyzed/not available

SPLP Synthetic precipitation leaching procedure

TCLP Toxicity characteristic leaching procedure

U Chemical was not detected; the detection limit is shown.

TABLE 4-7
 Inorganic Compounds Detected In Groundwater, RFI Addendum Investigations
RFI Report Addendum and IM Completion Report, SWMU 36/AOC 620, Zone F, Charleston Naval Complex

Analyte	Sample ID	Concentration (µg/L)	Qualifier	Date Collected	MCL/RBC ^a	Background Reference Concentration ^b
Aluminum	F620GW001	834	=	19-Nov-97	3,700 ^f	224
	F620GW003	137	=	11-Feb-98		
	F620GW004	398	=	19-Nov-97		
	F620GW004	293	=	11-Feb-98		
Antimony	F620GW001	1.9	J	19-Nov-97	6	NA
	F620GW004	3.8	J	19-Nov-97		
Arsenic	F620GW001	6.3	J	19-Nov-97	50	16.7
	F620GW002	3.8	J	17-Nov-97		
	F620GW003	6.7	J	17-Nov-97		
	F620GW004	8.3	J	19-Nov-97		
Barium	F620GW001	317	J	19-Nov-97	2,000	94.3
	F620GW002	28.7	=	17-Nov-97		
	F620GW003	1,770	J	11-Feb-98		
	F620GW003	57.4	=	17-Nov-97		
	F620GW004	37.2	J	19-Nov-97		
	F620GW004	20.2	J	11-Feb-98		
Cadmium	F620GW004	0.97	J	19-Nov-97	5	0.82
Calcium	F620GW001	95,600	=	19-Nov-97	NL	NA
	F620GW002	129,000	=	17-Nov-97		
	F620GW003	125,000	=	17-Nov-97		
	F620GW003	51,400	=	11-Feb-98		
	F620GW004	74,600	=	19-Nov-97		
	F620GW004	59,700	=	11-Feb-98		
Chromium, Total	F620GW001	8	J	19-Nov-97	100	2.05
	F620GW002	4.3	J	17-Nov-97		
	F620GW003	16	=	17-Nov-97		
	F620GW004	1.9	J	11-Feb-98		

TABLE 4-7

Inorganic Compounds Detected In Groundwater, RFI Addendum Investigations

RFI Report Addendum and IM Completion Report, SWMU 36/AOC 620, Zone F, Charleston Naval Complex

Analyte	Sample ID	Concentration (µg/L)	Qualifier	Date Collected	MCL/RBC ^a	Background Reference Concentration ^b
Cobalt	F620GW001	1.1	J	19-Nov-97	220	10.9
Copper	F620GW003	4.2	J	11-Feb-98	1,300	NA
Iron	F620GW001	3,710	J	19-Nov-97	1,100 ^c	51,600 - 62,300
	F620GW002	1,730	=	17-Nov-97		
	F620GW003	11,200	=	17-Nov-97		
	F620GW004	14,100	J	19-Nov-97		
	F620GW004	8,590	=	11-Feb-98		
Lead	F620GW003	3	J	11-Feb-98	15	NA
	F620GW004	2.9	J	11-Feb-98		
Magnesium	F620GW001	213,000	=	19-Nov-97	NL	NA
	F620GW002	5,790	=	17-Nov-97		
	F620GW003	17,200	=	17-Nov-97		
	F620GW003	4,250	=	11-Feb-98		
	F620GW004	161,000	=	19-Nov-97		
	F620GW004	126,000	=	11-Feb-98		
Manganese	F620GW001	186	=	19-Nov-97	73 ^c	2,010
	F620GW002	184	=	17-Nov-97		
	F620GW003	554	=	17-Nov-97		
	F620GW004	211	=	19-Nov-97		
	F620GW004	170	=	11-Feb-98		
Nickel	F620GW001	4.3	J	19-Nov-97	73 ^c	5.55
	F620GW003	28.2	J	17-Nov-97		
	F620GW003	1.5	J	11-Feb-98		
	F620GW004	1.6	J	19-Nov-97		
	F620GW004	0.97	J	11-Feb-98		
Potassium	F620GW001	25,500	=	19-Nov-97	NL	ND
	F620GW002	8,370	=	17-Nov-97		
	F620GW003	14,900	=	17-Nov-97		

TABLE 4-7

Inorganic Compounds Detected In Groundwater, RFI Addendum Investigations

RFI Report Addendum and IM Completion Report, SWMU 36/AOC 620, Zone F, Charleston Naval Complex

Analyte	Sample ID	Concentration ($\mu\text{g/L}$)	Qualifier	Date Collected	MCL/RBC ^a	Background Reference Concentration ^b
Potassium	F620GW003	52,700	=	11-Feb-98	NL	ND
	F620GW004	1,440	J	19-Nov-97		
	F620GW004	79,200	=	11-Feb-98		
Sodium	F620GW001	611,000	=	19-Nov-97	NL	NA
	F620GW004	1,570,000	J	11-Feb-98		
Vanadium	F620GW001	18.8	J	19-Nov-97	26 ^c	1.58
	F620GW003	1.3	J	17-Nov-97		
	F620GW004	16.6	J	19-Nov-97		
	F620GW004	12.2	J	11-Feb-98		

^aConcentrations listed in italics are for parameters that have no maximum contaminant values (MCL) values; EPA Region III tap water risk-based concentrations (RBCs) are used.

^bZone F background reference concentration for shallow groundwater.

^cMCL/RBC value is 1/10 the RBC.

= Chemical was detected at the concentration shown.

J Chemical was detected at concentration below the method detection limit; the concentration is not known.

$\mu\text{g/L}$ Micrograms per liter

NA Not analyzed/not available

ND Not detected

NL Not listed

TABLE 4-8

Organic Compounds Detected In Groundwater, RFI Addendum Investigations

RFI Report Addendum and IM Completion Report, SWMU 36/AOC 620, Zone F, Charleston Naval Complex

Analyte	Sample Location	Concentration ($\mu\text{g/L}$)	Qualifier	Date Collected	MCL/RBC ^a	Background Reference Concentration
Acenaphthene	F620GW003	2	J	17-Nov-97	37	NA
Ethylbenzene	F620GW001	1	J	19-Nov-97	700	NA
Xylenes, Total	F620GW001	7	=	19-Nov-97	10,000	NA
	F620GW004	2	J	19-Nov-97		

^aConcentrations listed in italics are for parameters that have no maximum contaminant level (MCL) values; 1/10 of the EPA Region III tap water risk-based concentration (RBC) is used.

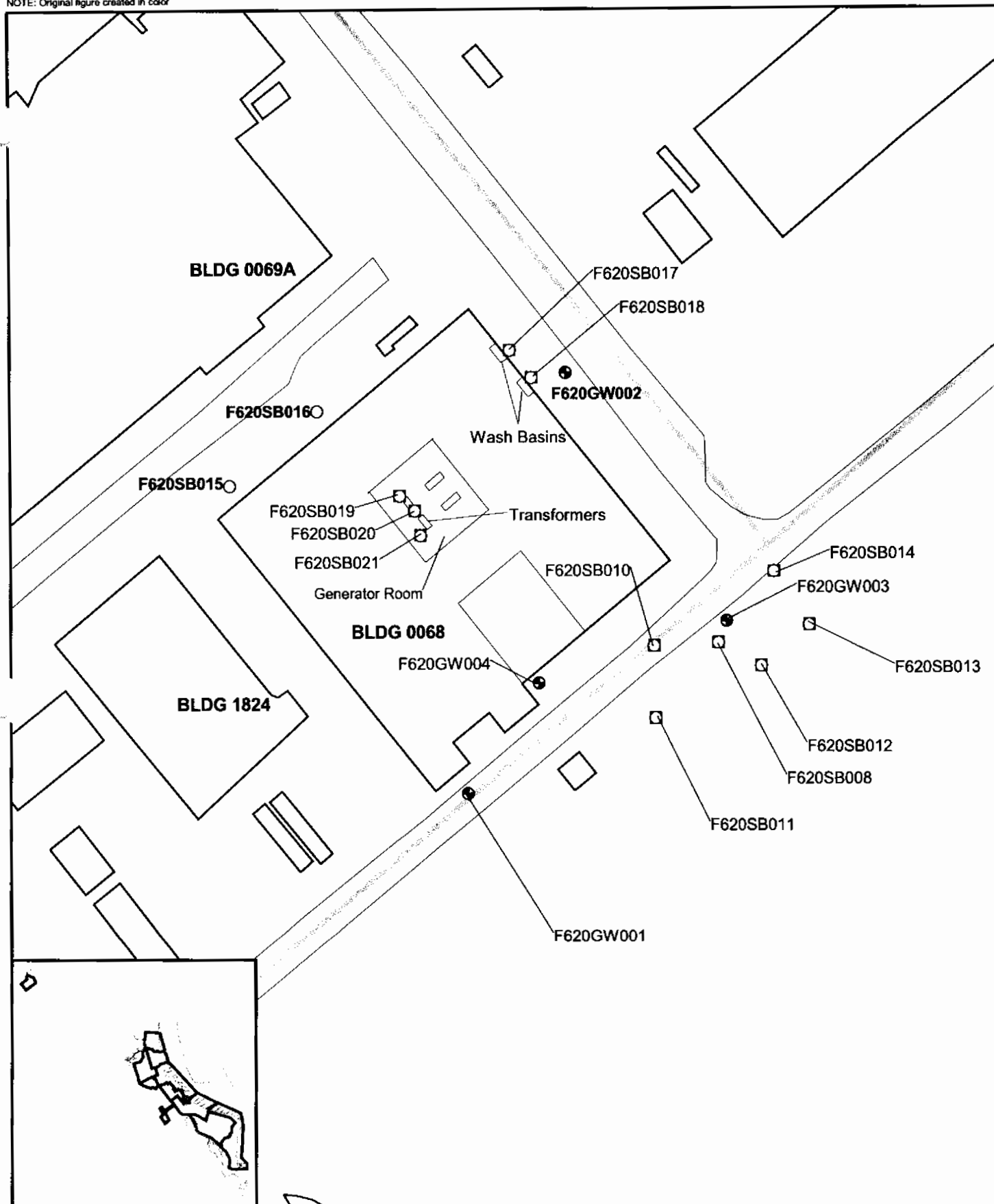
= Chemical was detected at the concentration shown.

J Chemical was detected at concentration below the method detection limit; the concentration is not known.

$\mu\text{g/L}$ Micrograms per liter

NA Not analyzed/not available

NOTE: Original figure created in color



- Groundwater Well
- Subsurface Soil
- Surface Soil
- ▭ Buildings
- Zone Boundary
- ∩ Roads

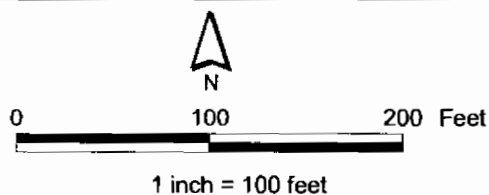
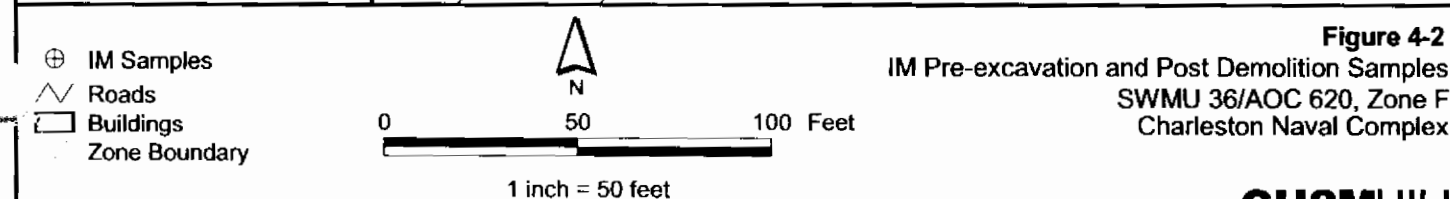
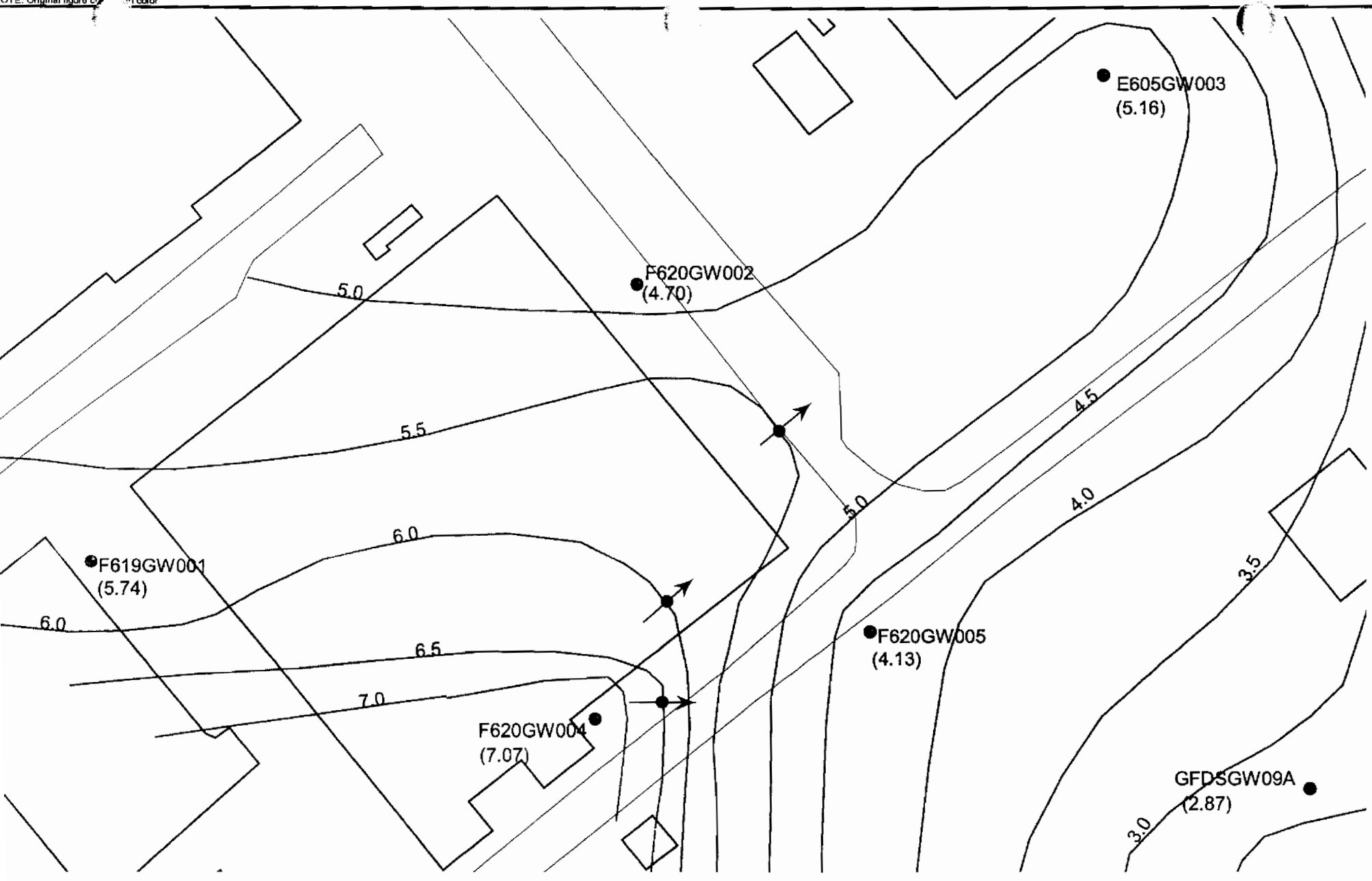


Figure 4-1
Additional RFI Samples
1999 and June 2001 Sampling Events
SWMU 36/AOC 620, Zone F
Charleston Naval Complex

CH2MHILL





- Flow Arrows
- ∨ Groundwater Contours, ft msl
- Groundwater Wells
- ∨ Roads
- Buildings
- 74) Groundwater Elevation, ft msl

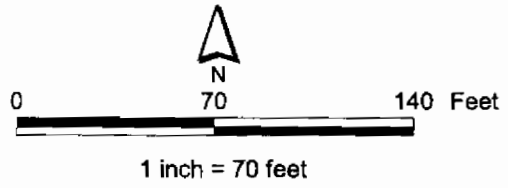


Figure 4-3
 May 14, 2002 Shallow Groundwater Contours
 AOC 620, Zone F
 Charleston Naval Complex

5.0 COPC/COC Refinement

This section discusses the chemicals that were identified in the *Zone F RFI Report, Revision 0* (EnSafe, 1997) as COPCs, as described in Section 2.0 of this RFIRA/IMCR, as well as the COPCs that were identified in subsequent sampling events, as described in Section 4.0.

These COPCs are further evaluated to determine if they are considered COCs at the SWMU 36/AOC 620 site. Some of the soil at this site was excavated and removed as part of an IM; therefore, some of the previously identified COPCs/COC are no longer COCs, as discussed below. Site-specific and area-specific MCSs were developed for lead and mercury during the soil excavation IM and are further evaluated in this section.

The surface and subsurface soil VOC data reported in the *Zone F RFI Report, Revision 0* were rescreened using an SSL based on a DAF=1; no VOCs were identified as COPCs as a result of this rescreening effort. Table 5-1 presents a summary of the detected VOCs in soil, which were rescreened against an SSL based on a DAF=1.

5.1 Surface Soil COCs

Surface soil chemicals identified as COPCs in the *Zone F RFI Report, Revision 0*, and as a result of the additional sampling efforts are the following:

- Aluminum
- Antimony
- Arsenic
- Chromium
- Lead
- Mercury
- BEQs
- PCBs (Aroclor-1254 and Aroclor-1260)

Comprehensive data for these parameters are presented in Tables 5-2 through 5-5. Each parameter is discussed in the subsections below.

5.1.1 Aluminum

Table 5-2 presents aluminum data from surface soil samples collected at SWMU 36/AOC 620. Aluminum slightly exceeded the combined background range for Zones F and G (2,190

1 to 19,400 mg/kg) in one sample at the site. This exceedance was detected at soil boring
2 F620SB008, at a concentration close to the background range (21,100 mg/kg). This location
3 was resampled in 1999 and resulted in a surface soil aluminum concentration of 6,750
4 mg/kg. The maximum detected concentration is above the EPA Region III residential RBC
5 (HI=0.1) of 7,800 mg/kg, however it is below the residential RBC at HI=1.0, and also below
6 the industrial land use RBC (HI=0.1) of 200,000 mg/kg.

7 Aluminum is an abundantly occurring element that is particularly common in clayey soils.
8 The highest detected aluminum concentration at F620SB008 is located across the street away
9 from historical site operations, and no other metals were particularly elevated above criteria
10 in this sample. In other parts of CNC, background aluminum concentrations of up to 55,500
11 mg/kg were reported; all other aluminum concentrations measured at SWMU 36/AOC 620
12 are within the basewide background range. Therefore, aluminum is not considered a COC
13 in surface soil and does not warrant further investigation or action at SWMU 36/AOC 620.

14 5.1.2 Antimony

15 Table 5-2 presents antimony data from surface soil samples collected at SWMU 36/AOC
16 620. Figure 5-1 shows the results for antimony in surface soil at SWMU 36/AOC 620. With
17 one exception, antimony was detected at estimated concentrations (J values) within
18 background levels. The site concentration range was 0.53 to 2.7 mg/kg, compared to the
19 combined background range for Zones F and G (0.5 to 5.7 mg/kg). However, at the soil
20 boring location F620SB018, which is beneath the loading dock in the wash basin area,
21 antimony was detected at 48.5 J mg/kg, which is in excess of the background range, the
22 residential RBC (HI=0.1) of 3.1 mg/kg, and the generic SSL (DAF=10) of 2.5 mg/kg.
23 Therefore, antimony was identified as a COPC during the RFI. The soils with this elevated
24 antimony were removed during the IM in March 2002.

25 Soil remaining at AOC 620 after completion of the IM contains antimony at concentrations
26 within the background range. No remaining soil samples contain antimony at a
27 concentration above the residential RBC (HI=0.1) of 3.1 mg/kg. Therefore, antimony is not
28 considered a COC in surface soil at SWMU 36/AOC 620.

29 5.1.3 Arsenic

30 As presented in Section 2.0 of this RFIRA/IMCR, arsenic was identified as a surface soil
31 COC in the HHRA for the future unrestricted (i.e., residential) land use scenario in the *Zone*
32 *F RFI Report, Revision 0*. Table 5-2 presents arsenic data from surface soil samples collected at
33 SWMU 36/AOC 620. One sample location at exceeded the range of background sample

1 concentrations for combined Zones F and G, 3.0 to 30 mg/kg. The sample from location
2 F620SB007 contained arsenic at 31.5 J mg/kg, which is similar to the background maximum.
3 The range of background concentrations for arsenic in Zone E, located approximately 100
4 feet from sample F620SB007 and in a similarly heavy industrial area, is 0.95 to 67.5 mg/kg.

5 The sample with maximum detected arsenic concentration is located away from the site
6 near the site boundary. Another sample located directly south within 20 to 30 feet
7 (F620SB010) had arsenic at 2.6 mg/kg, indicating elevated arsenic occurrence is not
8 widespread. The subsurface soil sample from the same location (1.3 J mg/kg) did not have
9 elevated arsenic levels, indicating it is neither from disposal nor is it leaching to subsurface
10 soil. The groundwater sample (F620MW003) located within this area of the site did not have
11 detectable levels of arsenic. The UCL₉₅ Exposure Point Concentration (EPC) for surface soil
12 arsenic at the site after the IM is 29.9 mg/kg, which exceeds both the residential and
13 industrial RBCs. For sites where background arsenic levels exceed RBCs, EPA Region IV
14 typically considers arsenic concentrations in surface soil of up to 20 mg/kg for unrestricted
15 (residential) land use and 270 mg/kg for industrial land use (EPA, 2001). Based on these
16 criteria, arsenic in surface soil would be considered a COC for unrestricted land use but not
17 for industrial land use.

18 **5.1.4 Chromium**

19 Total chromium concentrations in surface soil at SWMU 36/ AOC 620 were within the range
20 of background concentrations (6.3 to 39 mg/kg), with the exception of one sample collected
21 from F620SB008 (43.2 mg/kg), near the railroad line south of Building 68, on the opposite
22 side of Kilo Street. This location was resampled in 1999 and resulted in a total chromium
23 concentration of 32.8 mg/kg, which is within the background range for Zones F and G.

24 The single exceedance concentration was higher than the generic SSL (DAF=10) of 19
25 mg/kg (based on allowable chromium VI concentrations in groundwater) and above the
26 hexavalent chromium unrestricted land use RBC of 23 mg/kg (HI=0.1). No values exceeded
27 the residential RBC of 230 mg/kg (HI=1.0) or the industrial RBC of 610 mg/kg (HI=0.1).
28 Chromium VI was analyzed in two duplicate samples from AOC 620 and was not detected
29 (see the *Zone F RFI Report, Revision 0*), indicating that the hexavalent form of chromium is
30 not occurring at this site. There is no evidence suggesting the presence of chromium VI at
31 this site.

32 None of the reported chromium values exceeded the trivalent chromium residential RBC of
33 12,000 mg/kg (HI=0.1). Also, the UCL₉₅ EPC for surface soils at the site, calculated at 20.8
34 mg/kg, was below the hexavalent chromium residential RBC at HI=0.1 of 23 mg/kg.

The average residual chromium concentration in surface soil at AOC 620, after the IM soil removal, is calculated at 16.9 mg/kg, which is lower than the generic SSL of 19 mg/kg. Furthermore, groundwater at AOC 620 has been sampled routinely for chromium, where the results showed that the maximum detected chromium at 0.016 milligrams per liter (mg/L) was lower than the MCL of 0.1 mg/L. Table 5-3 presents the results for chromium in site groundwater. Although the total chromium surface soil concentration may exceed the generic SSL at one location, the site mean concentration is lower than the SSL, and the groundwater data indicate that total chromium has not leached to concentrations above the MCL. Therefore, chromium is not considered a COC for either direct exposure or leachability in surface soil at SWMU 36/AOC 620.

5.1.5 Lead

As shown in Table 5-4, lead concentrations in surface soil were measured as high as 18,400 mg/kg in the wash basin area, and as high as 4,250 mg/kg at F620SB004 in the acid tank room area. Since the detected lead was related to historical site operations and concentrations were well above health protective levels, these two distinct areas were identified for IM removal activities. The IM Completion Report is presented in Section 7.0 of this document. Figure 5-2 presents lead concentrations in surface soil at SWMU 36/AOC 620.

For three areas within AOC 620, area-specific SSLs were developed using SPLP data. The complete derivation of the DAF and SSLs for lead and mercury at AOC 620 is presented in the *Phase II Interim Measure Work Plan, SWMU 36/AOC 620, Zone F, Revision 0* (CH2M-Jones, 2001e) attached as Appendix F to this document. The area-specific SSLs in the wash basin area are 56 mg/kg beneath the loading dock in the IM area, and 670 mg/kg beneath the remainder of the wash basin area (the east side of AOC 620). The loading dock area with the calculated SSL of 56 mg/kg correlated with elevated lead concentrations in soil; the remaining wash basin area correlated with soil lead levels similar to background concentrations. The area-specific SSL in the acid tank room area was calculated at 3,200 mg/kg. The more conservative value of 670 mg/kg was assumed as the site-specific SSL for the soil outside of the Wash Basin IM area and greater than 50 feet away from the acid tank room (i.e., surrounding the remainder of AOC 620).

Human health-based cleanup standards specific to lead exposure at CNC were also presented in the *Phase II Interim Measure Work Plan*. For the unrestricted (i.e., residential) land use scenario, a value of 400 mg/kg was used as the target cleanup level for surface soil. For the industrial worker exposure scenario, a level of 1,220 mg/kg was derived using the

1 EPA Adult Lead Methodology, as detailed in the Technical Memorandum *Adult Lead*
2 *Methodology (ALM) Derived Target Lead Concentrations for Industrial Land Use* (CH2M-Jones,
3 2001d).

4 As shown in Table 5-4, after the IM soil removal (sample locations removed during the IM
5 are indicated by the table note "c"), the remaining soil may contain lead concentrations as
6 high as 1,810 mg/kg, at sample location F620SB004. During the initial RFI sampling in 1996,
7 a normal sample and a duplicate field sample were collected at this location, with lead
8 concentrations of 4,250 and 1,070 mg/kg. An additional surface soil sample collected 2 feet
9 north of monitoring well F620GW004 for the Phase IV IM had a lead concentration of 111
10 mg/kg in surface soil. The average of these three values (1,810 mg/kg) is assumed as the
11 lead concentration at that location and is used in evaluating area-wide lead concentrations
12 outside of the building in the acid tank room area. This localized area was not removed
13 during the IM in order to maintain the integrity of monitoring well F620GW004.

14 Table 5-4 shows lead concentrations in surface soil, including the post-demolition samples
15 collected in the acid tank room area, as discussed in Sections 4.0 and 7.0 of this report. The
16 average lead concentration within a ½-acre area south of the acid tank room and
17 surrounding the IM area was calculated at 269 mg/kg, not including the soil removed
18 during the IM. The data used to calculate this average are shown in italics in the table (and
19 indicated by the table note "d"). This average value is the exposure concentration for the
20 exposure area, as presented in Figure 5-3. The average lead concentration in surface soil for
21 the entire AOC 620 area after IM soil removal was calculated at 189 mg/kg. Both of these
22 average values are less than the unrestricted land use MCS of 400 mg/kg.

23 The results of the RFI indicate that lead is considered a COPC in surface soil at AOC 620.
24 However, soil at the locations with highly elevated lead levels was removed during the IM
25 remediation activities. The IM reduced exposure concentrations to less than the MCS or
26 area-specific SSLs. Therefore, as a result of the IM, lead is not considered a COC in surface
27 soil at SWMU 36/AOC 620.

28 **5.1.6 Mercury**

29 Figure 5-4 shows mercury concentrations within surface and subsurface soil at SWMU
30 36/AOC 620. Table 5-2 presents mercury concentrations in surface soil samples. Mercury
31 was detected at elevated concentrations in surface soil at two locations in the wash basin
32 area beneath the loading dock: F620SB017 (3.78 mg/kg) and F620SB018 (5.05 mg/kg). These
33 concentrations exceed the background range of 0.06 to 2 mg/kg, the residential RBC
34 (HI=0.1) of 2.3 mg/kg, and the generic SSL of 1 mg/kg (DAF=10). Soil at both locations with

elevated mercury concentrations was removed in the March 2002 IM. The maximum mercury concentrations remaining in surface soil after the IM is 1.06 mg/kg, which is below the residential RBC of 2.3 mg/kg (HI=0.1), and is within the combined range of background concentrations for Zones F and G. Mercury has not been detected in AOC 620 groundwater samples. The results for mercury in groundwater are presented in Table 5-3.

As a result of the IM, the residual mercury level is within background levels, and does not present a human exposure or a leachability concern. Therefore, mercury is not considered a COC for surface soil at SWMU 36/ AOC 620.

5.1.7 BEQs

Table 5-5 lists BEQ concentrations in surface soil at SWMU 36/ AOC 620. Out of the 12 samples analyzed for BEQs, concentrations were below the sitewide reference concentration of 1.304 mg/kg with one exception, at F620SB017 (1.683 mg/kg). Soil at this location was removed during the March 2002 IM. Therefore, no soil samples with BEQs above the site reference concentration of 1.304 mg/kg remain onsite, and BEQs are no longer considered a COC for surface soil at SWMU 36/ AOC 620.

5.1.8 Aroclor-1254 and Aroclor-1260

Table 5-5 lists data for the PCBs Aroclor-1254 and Aroclor-1260 at SWMU 36/ AOC 620. Both PCBs were detected south of Building 68 at F620SB004 in excess of the residential RBC of 0.32 mg/kg, but lower than the industrial RBC of 2.9 mg/kg. Aroclor-1254 was detected beneath the generator room at concentrations up to 1.12 mg/kg. The maximum Aroclor-1260 concentration beneath the generator room was measured at 0.293 mg/kg. PCBs were also detected at concentrations lower than the residential RBC on the northwest and northeast sides of the building, and near the railroad line southeast of Building 68. The pattern of the detections outside of the building is shown in Figure 5-5.

The detected PCBs were not co-located with the elevated metals concentrations associated with this site, and thus were not part of the IM removal actions at AOC 620. Although the source of the PCBs detected beneath the generator room may have been from leaking transformers within that room, the concentrations detected within the soil are not above industrial land use RBC values.

The UCL₉₅ estimates for these chemicals are presented in Appendix G. The UCL₉₅ value for Aroclor-1254 is estimated at 0.277 mg/kg, which is below the residential RBC value of 0.32 mg/kg. The UCL₉₅ value for Aroclor-1260 is estimated at 0.19 mg/kg, which is also below the residential RBC. Although individual PCB concentrations in three samples were above

the residential RBC, the sitewide exposure concentrations are below residential RBC values. Thus, the presence of PCBs at the site does not present a significant human exposure concern, and PCBs are not identified as COCs at this site. There are no other carcinogenic chemicals identified as COPCs/COCs at this site, thus the cumulative exposure is also not a concern for AOC 620.

5.2 Subsurface Soil COCs

Subsurface soil chemicals were identified as COPCs in the *Zone F RFI Report, Revision 0* and in the Zone L samples collected within the AOC 620 investigated area. Additional RFI sampling efforts and the IM pre-excavation samples also identified subsurface soil COPCs. They are the following:

- Antimony
- Chromium
- Lead
- Mercury
- 4-Methylphenol

The data for each of these parameters are presented Tables 5-6 and 5-7. Each parameter is discussed in the subsections below.

5.2.1 Antimony

As seen in Table 5-6 and Figure 5-1, antimony was detected at slightly elevated concentrations in the soil probes collected for AOC 699, the storm sewer, near the southeast corner of Building 68. Samples LF699SP001 and LF699SP002 had antimony concentrations reported at 2.67 and 4.28 mg/kg, respectively, compared to a generic SSL (DAF=10) of 2.5 mg/kg. Antimony was not detected in the 13 subsurface soil background samples from Zones F or G; however, the background range for antimony in subsurface soil from Zone E, which is adjacent to AOC 620, is 0.52 to 1.6 mg/kg. The surface and subsurface soils are likely mixed due to long-term historical industrial activities reported for this site. The detected subsurface antimony range is well within the background range for surface soils of 0.5 to 5.7 mg/kg. The highest detected concentration of 4.28 mg/kg was located within the railroad lines away from historical operations at AOC 620.

The average antimony residual concentration in subsurface soil at SWMU 36/ AOC 620 is calculated at 1.39 mg/kg (not including sample locations removed during the IM). This average value is less than the SSL of 2.5 mg/kg. The groundwater data at AOC 620 confirm

that antimony leaching from soil has not affected the groundwater to concentrations above the MCL (see Table 5-8 for antimony results in groundwater). Therefore, antimony is not considered a COC in subsurface soil at SWMU 36/ AOC 620.

5.2.2 Chromium

Chromium was identified in subsurface soil at elevated concentrations near the southeast corner of Building 68. Figure 5-6 presents the concentrations of chromium measured in subsurface soil, and Table 5-6 lists the data. The maximum concentration detected was at soil boring F620SB008 (269 mg/kg), which is located across the street away from the site. The groundwater monitoring well F620GW003, which is located adjacent to this sample location and directly downgradient of the building's southeast corner, has been routinely sampled for chromium, and did not have elevated chromium levels. The highest concentration in the groundwater from the well was 16 µg/L, compared to the MCL of 100 µg/L. Table 5-3 presents the analytical results for chromium in groundwater.

The site average chromium level in subsurface soil is 50.9 mg/kg, which is above the generic SSL of 19 mg/kg. The chromium concentrations in four of the subsurface soil samples are above background levels and the generic SSL. The SSL is based on chromium VI. Chromium VI was analyzed in two duplicate soil samples from AOC 620 and was not detected; there is no evidence suggesting the presence of chromium VI at this site. The SSL for trivalent chromium in the EPA SSL guidance document is six orders of magnitude higher, which is not exceeded by the maximum detected concentration at this site.

Therefore, although the total chromium subsurface soil concentration may exceed the generic SSL for chromium VI, the groundwater data indicate that chromium has not leached to concentrations above the MCL. Therefore, chromium is not considered a COC in subsurface soil at SWMU 36/ AOC 620.

5.2.3 Lead

Figure 5-7 presents lead concentrations in subsurface soil at SWMU 36/ AOC 620. As shown in the figure and in Table 5-7, lead concentrations in subsurface soil were measured as high as 1,350 mg/kg in the wash basin area, and as high as 3,880 mg/kg at F620SB036 in the acid tank room area. These two distinct areas were removed during the March 2002 and December 2002 IM removal activities, as detailed in Section 7.0 of this RFIRA/IMCR.

As previously discussed, area-specific SSLs were calculated at 56 mg/kg, 670 mg/kg, and 3,200 mg/kg within AOC 620. The site-specific SSL of 670 mg/kg is selected as being representative of AOC 620.

As shown in Table 5-7, residual soil concentrations after the completion of the IM have a maximum of 3,760 mg/kg, from 1 to 2 ft bls at sample location F620SB075, which is south of the acid tank room. The average lead concentration in subsurface soil within a ½-acre area south of the acid tank room and surrounding the IM area was calculated at 337 mg/kg. The average lead concentration in subsurface soil for the entire AOC 620 after IM soil removal was calculated at 245 mg/kg. These values are both less than the site-specific SSL of 670 mg/kg. Therefore, lead in the subsurface soil is not expected to impact groundwater at the site, and lead is not considered a COC in subsurface soil at SWMU 36/ AOC 620.

5.2.4 Mercury

Figure 5-4 shows mercury concentrations within surface and subsurface soil at SWMU 36/ AOC 620. Table 5-6 presents mercury concentrations in subsurface soil samples. Mercury was detected at elevated concentrations in subsurface soil at two locations in the wash basin area beneath the loading dock. At soil boring F620SB017, mercury was detected at 4.32 mg/kg; at soil boring F620SB018, mercury was detected at 3.48 mg/kg. These concentrations exceed the background range of 0.04 to 0.57 mg/kg and the generic SSL of 1 mg/kg. The soil at both locations with elevated mercury concentrations was removed in the March 2002 IM. The average mercury concentration remaining in subsurface soil after the IM is calculated at 0.42 mg/kg, which is lower than the SSL. Mercury has not been detected in AOC 620 groundwater samples (see Table 5-3 for mercury groundwater results), thus there has not been a historic leachability issue. Therefore, due to the lack of historical migration to groundwater, and the removal of elevated levels of mercury from the site soils during the IM, mercury is not considered a COC in subsurface soil at SWMU 36/ AOC 620.

5.2.5 4-Methylphenol

4-Methylphenol was detected in one of the nine subsurface soil samples in which it was analyzed, as shown in Table 5-6. 4-Methylphenol was not detected in any of the surface soil samples collected. As stated in the *Zone F RFI Report, Revision 0*, a concentration of 2.2 mg/kg was reported in the subsurface soil sample from F036SB001. Though this concentration was above an SSL of 1.38 mg/kg (DAF=20), which is equivalent to an SSL of 0.69 mg/kg based on a DAF=10, it was not detected in groundwater in the monitoring wells downgradient from the soil sample in which it was detected. 4-Methylphenol is a constituent of gasoline range petroleum hydrocarbons which are not associated with Building 68 operations. The soil at this location, which is beneath the acid tank room, was removed during the IM in 2002. 4-Methylphenol was not detected at any other locations

within SWMU 36/ AOC 620. Therefore, because 4-methylphenol has been removed from the site, it is not considered a COC in subsurface soil at SWMU 36/ AOC 620.

5.3 Groundwater COCs

Barium, lead, and thallium were identified as COPCs in groundwater in the *Zone F RFI Report, Revision 0*. No COPCs were identified in the subsequent groundwater sampling events at SWMU 36/ AOC 620. Table 5-9 presents barium, lead, and thallium data for each site monitoring well. Concentrations were screened against MCLs, BRCs, and the combined range of background concentrations for Zones E, F, and G. The zone background concentrations are combined because of the small data sets for Zones F and G. Combining background data sets for these zones is deemed appropriate, as Zones E, F, and G are all industrial in nature and are in close proximity to SWMU 36/ AOC 620. Each of these COPCs is discussed below.

5.3.1 Barium

Barium was identified in the *Zone F RFI Report, Revision 0*, as a COPC. As shown in Table 5-9, barium concentrations measured in all SWMU 36/ AOC 620 groundwater samples were below the MCL of 2,000 $\mu\text{g/L}$. Therefore, barium is not considered a COC in groundwater.

5.3.2 Lead

Table 5-9 presents the results of lead analyses in SWMU 36/ AOC 620 groundwater. With one exception, lead was detected below the Zones E and G BRCs (4.6 and 4.8 $\mu\text{g/L}$, respectively) in all sample locations. Lead was detected at 30.7 $\mu\text{g/L}$ in the first sampling event at F620GW004 in April 1997, compared to an MCL of 15 $\mu\text{g/L}$. The subsequent four sampling events were non-detects three times and a detected concentration of 2.9 $\mu\text{g/L}$ in 1998, which is less than the MCL. Lead was not detected in the latest sampling event, conducted in 2001. Because the last four sampling events after September 1997 have lead concentrations well below the MCL, and any potential future contributions from soil and operations-related sources have been removed through the IMs implemented at this site, lead is not considered a COC in groundwater at SWMU 36/ AOC 620.

5.3.3 Thallium

Thallium was detected in three of the 16 groundwater samples collected at the site, from three different wells. Two of the detects were during the first sampling event in 1996 and one was during the first sampling event for well F620GW003, in 1997. Thallium was detected at well F620GW001 at 11 $\mu\text{g/L}$ in 1996, which was above the MCL of 2 $\mu\text{g/L}$.

1 However, thallium was not detected in the subsequent three sampling events for this well.
2 Two of the site detects are "J" flagged, or estimated concentrations (2.8 and 5.2 $\mu\text{g/L}$) near
3 the method detection limit (MDL). These two wells did not contain detectable amounts of
4 thallium in subsequent sampling events.

5 Table 5-9 shows the thallium analysis for groundwater at the site. The most recent data
6 indicate that thallium is not present above the reporting limits. Additionally, thallium is not
7 a soil COPC/COC, and releases of thallium have not occurred at the site during historical
8 operations. Based on these considerations, thallium is not considered a COC in groundwater
9 at this site.

10 **5.4 Summary of COCs**

11 Soil with elevated concentrations of antimony, lead, mercury, BEQs, and 4-methylphenol
12 were removed during the IM at AOC 620. The remaining concentrations of soil PCBs
13 Aroclor-1254 and Aroclor-1260 were below the residential RBC of 0.32 mg/kg, when EPCs
14 (i.e., UCL_{95}) were estimated. The residual PCBs were also below industrial RBCs as well as
15 EPA action levels for the unrestricted land use-based value of 1 mg/kg. None of the
16 remaining chemicals at the site, including lead, are considered COCs under industrial land
17 use scenario.

18 The mean lead concentrations in the $\frac{1}{2}$ -acre exposure area after the IM was conducted were
19 calculated at less than the unrestricted (i.e., residential) land use MCS and the area-specific
20 SSL, indicating that lead is not a COC at this site. However, because surface and near-
21 surface (1 to 2 ft bls) soil at isolated locations south of the acid tank room IM area have
22 individual samples with lead concentrations greater than the unrestricted land use MCS of
23 400 mg/kg, it is recommended that this area be restricted for industrial usage, within the
24 industrial land use control (LUC) area of the CNC. Based on a review of the data, arsenic in
25 surface soil is identified as a COC under the unrestricted land use scenario. No COCs are
26 identified in soil or groundwater at SWMU 36/ AOC 620 under the industrial land use
27 scenario.

TABLE 5-1

VOC Concentrations in Surface and Subsurface Soil Compared to SSL (DAF=1)

RFI Report Addendum and IM Completion Report, SWMU 36/AOC 620, Zone F, Charleston Naval Complex

Analyte	Sample ID	Sample ID	Concentration (mg/kg)	Qualifier	Date Collected	SSL (DAF=1)
Acetone	Surface Soil					
	F620SB001	620SB00101	0.042	=	09/16/1996	0.8
	F620SB017	620SB01701	0.0335	J	06/06/2001	
	F620SB018	620SB01801	0.0146	J	06/06/2001	
	Subsurface Soil					
	F620SB017	620SB01703	0.0634	J	06/06/2001	
Benzene	Surface Soil					
	F620SB017	620SB01701	0.001	J	06/06/2001	0.002
Carbon Disulfide	Subsurface Soil					
	F620SB008	620SB008T2	0.004	J	10/15/1999	2
	F620SB017	620SB01703	0.029	=	06/06/2001	
	F620SB018	620SB01803	0.022	=	06/06/2001	
Methyl ethyl ketone (2-Butanone)	Surface Soil					
	F620SB001	620SB00101	0.003	J	09/16/1996	0.4
	F620SB002	620SB00201	0.002	J	08/27/1996	
	F620SB017	620SB01701	0.016	J	06/06/2001	
	Subsurface Soil					
	F036SB001	036SB00102	0.010	J	10/09/1996	
	F620SB005	620SB00502	0.010	J	09/16/1996	
	F620SB008	620SB008T2	0.002	J	10/15/1999	
	F620SB017	620SB01703	0.0233	J	06/06/2001	
	Surface Soil					
Methyl isobutyl ketone (4-Methyl-2-pentanone)	Surface Soil					
	F036SB003	036SB00301	0.001	J	10/09/1996	0.065
Toluene	Surface Soil					
	F620SB008	620SB008T1	0.004	=	10/15/1999	0.6
Xylenes, Total	Surface Soil					
	F036SB002	036SB00201	0.002	J	10/08/1996	9

= Chemical was detected at the concentration shown.

J Chemical was detected at concentration below the method detection limit; the concentration is not known.

mg/kg Milligrams per kilogram

TABLE 5-2

Surface Soil Metals Selected for COPC Refinement

RFI Report Addendum and IM Completion Report, SWMU 36/AOC 620, Zone F, Charleston Naval Complex

		Aluminum		Antimony		Arsenic		Chromium		Mercury	
	Units	(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)	
	SSL ^a	NL		2.5		15		19		1	
	Unrestricted Land Use RBC ^b	7,800		3.1		0.43		210		2.3	
	Industrial Land Use RBC ^b	200,000		82		3.8		450		61	
	Zones F & G Background Range	2,190 - 19,400		0.5 - 5.7		3 - 30		6.3 - 39		0.06 - 2	
Station ID	Date Collected	Conc.	Q.	Conc.	Q.	Conc.	Q.	Conc.	Q.	Conc.	Q.
F036SB001 ^c	09-Oct-96	768	=	1.1	J	2.3	J	2.4	=	0.17	J
F036SB002	08-Oct-96	1,060	=	0.53	J	1.3	J	2.5	=	0.33	J
F036SB003 ^c	09-Oct-96	34.1	=	0.37	UJ	0.4	U	1.4	=	0.11	J
F620SB001	16-Sep-96	4,380	=	0.36	UJ	7.2	J	10.1	=	0.11	=
F620SB002	27-Aug-96	2,340	=	0.35	U	2.3	=	4.6	=	0.04	U
F620SB003	16-Sep-96	3,950	=	2.5	J	13.1	J	20.3	=	0.11	=
F620SB004	10-Sep-96	7,540	=	0.75	J	15.9	J	16.9	=	0.34	=
F620SB005	16-Sep-96	8,420	=	0.49	UJ	15.2	J	18.3	=	0.56	=
F620SB006	04-Oct-96	5,200	=	0.39	UJ	8.8	=	11.7	J	0.04	U
F620SB007	09-Jan-97	5,950	=	2.7	J	31.5	J	34.1	J	0.79	=
F620SB008	09-Jan-97	21,100	=	1.6	J	22.6	J	43.2	J	0.27	=
F620SB008	15-Oct-99	6,750	=	1.7	J	15.1	J	32.8	J	0.38	=
F620SB009	10-Jan-97	6,430	=	0.35	UJ	2.9	J	8.9	J	0.09	=
F620SB010	17-Nov-99	5,620	J	NA		2.6	J	8.0	J	0.05	J
F620SB011	16-Nov-99	8,450	J	NA		4.8	J	16.8	J	0.05	J
F620SB012	16-Nov-99	6,120	J	NA		27.3	J	21.6	J	0.2	J
F620SB013	16-Nov-99	13,000	J	NA		12.4	J	30.6	J	0.22	J
F620SB014	16-Nov-99	4,860	J	NA		18.5	J	11.3	J	0.04	UJ
F620SB017 ^c	06-Jun-01	8,300	=	0.67	J	5.12	=	20.6	=	3.78	=
F620SB018 ^c	06-Jun-01	2,680	=	48.5	J	3.18	=	8.7	=	5.05	=
F620SB022	10-Oct-01	NA		NA		NA		NA		0.066	J
F620SB023	10-Oct-01	NA		NA		NA		NA		0.031	J
F620SB029	10-Oct-01	NA		NA		NA		NA		0.034	J
F620SB030 ^c	10-Oct-01	NA		NA		NA		NA		1.68	=
F620SB034 ^c	10-Oct-01	NA		NA		NA		NA		0.361	=

TABLE 5-2

Surface Soil Metals Selected for COPC Refinement

RFI Report Addendum and IM Completion Report, SWMU 36/AOC 620, Zone F, Charleston Naval Complex

		Aluminum	Antimony	Arsenic	Chromium	Mercury
	Units	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
	SSL ^a	NL	2.5	15	19	1
	Unrestricted Land Use RBC ^b	7,800	3.1	0.43	210	2.3
	Industrial Land Use RBC ^b	200,000	82	3.8	450	61
	Zones F & G Background Range	2,190 - 19,400	0.5 - 5.7	3 - 30	6.3 - 39	0.06 - 2

Station ID	Date Collected	Conc.	Q.	Conc.	Q.	Conc.	Q.	Conc.	Q.	Conc.	Q.
F620SB053	26-Nov-01	NA		NA		NA		NA		1.06	=
Mean Concentration before IM ^d		5,738		4.25		10.18		15.1		0.62	
Mean Concentration after IM		6,483		0.91		12.2		16.9		0.23	
Maximum Concentration after IM		21,100		2.7		31.5		43.2		1.06	

Concentrations in bold and outlined within the table indicate an exceedance of screening criteria.

^a Soil screening level (SSL) from EPA *Soil Screening Guidance: Technical Background Document*, Appendix A, Table A-1 (1996), based on a dilution attenuation factor (DAF)=10, except as noted.

^b Risk-based concentration (RBC) from EPA Region III Table (October 5, 2000); adjusted for hazard index (HI)=0.1.

^c Soil at this sample location was removed during interim measure (IM) activities.

^d Mean calculated using one-half the reported detection limit for non-detected data.

= Chemical was detected at the concentration shown.

Conc. Concentration

J Chemical was detected at concentration below the method detection limit; the concentration is not known.

mg/kg Milligrams per kilogram

NA Not analyzed/not available

NL Not listed

Q. Qualifier

U Chemical was not detected; the reported value is the detection limit.

UJ Chemical was not detected; the reported value is an estimated detection limit.

TABLE 5-3
 COPC Refinement of Antimony, Chromium, and Mercury in Groundwater
 RFI Report Addendum and IM Completion Report, SWMU 36/AOC 620, Zone F, Charleston Naval Complex

		Antimony		Chromium		Mercury	
Units		($\mu\text{g/L}$)		($\mu\text{g/L}$)		($\mu\text{g/L}$)	
MCL ^a		6		100		2	
Zone E BRC		NA		12.3		NA	
Zone F BRC		NA		2.05		NA	
Zone G BRC		4.85		3.88		NA	
Zones E, F, & G Background Range		2 - 6		0.8 - 31		0.14 - 0.6	
Station ID	Date Collected	Conc.	Qual.	Conc.	Qual.	Conc.	Qual.
F620GW001	08-Nov-96	2.1	U	2.2	J	0.1	U
	09-May-97	3.3	J	4.9	J	0.1	U
	29-Aug-97	5.9	U	7.2	J	0.1	U
	19-Nov-97	1.9	J	8	J	0.1	U
F620GW002	04-Nov-96	3	U	0.8	U	0.1	U
	12-May-97	2.1	J	1	U	0.1	U
	29-Aug-97	1.6	U	1.2	J	0.1	U
	17-Nov-97	2.2	U	4.3	J	0.1	U
	11-Oct-01	NA		NA		0.06	U
F620GW003	01-May-97	1.6	U	1	U	0.1	U
	02-Sep-97	2.7	U	1.4	J	0.2	U
	17-Nov-97	3.4	U	16	=	0.1	U
	11-Feb-98	1.6	U	1	U	0.1	U
F620GW004	30-Apr-97	1.6	U	1	U	0.1	U
	02-Sep-97	2.7	U	3.7	J	0.2	U
	19-Nov-97	3.8	J	2.8	U	0.1	U
	11-Feb-98	1.9	U	1.9	J	0.1	U

^aMaximum contaminant level (MCL) obtained from EPA National Primary Drinking Water Standards (March 2001).

= Chemical was detected at the concentration shown.

BRC Background reference concentration

Conc. Concentration

J Chemical was detected at concentration below the method detection limit; the concentration is not known.

$\mu\text{g/L}$ Micrograms per liter

NA Not analyzed/not available

Qual. Qualifier

U Chemical was not detected; the reported value is the detection limit.

TABLE 5-4
 COPC Refinement of Lead in Surface Soil
 RFI Report Addendum and IM Completion Report, SWMU 36/AOC 620, Zone F, Charleston Naval Complex

Station ID	Date Collected	Conc. (mg/kg)	Qual.	Unrestricted Land Use MCS ^a (mg/kg)	Industrial Land Use MCS ^a (mg/kg)	Area- specific SSL ^b (mg/kg)	Zones F & G Background Range (mg/kg)
F036SB001 ^c	09-Oct-1996	1,600	=	400	1,220	3,200	3.5 - 275
F036SB002 ^c	08-Oct-1996	69.6	=			3,200	
F036SB003 ^c	09-Oct-1996	70.3	=			3,200	
F620SB001	16-Sep-1996	41.9	=			670	
F620SB002	27-Aug-1996	47.9	=			670	
F620SB003	16-Sep-1996	166	=			670	
F620SB004 ^d	10-Sep-1996	4,250	=			3,200	
F620SB005	16-Sep-1996	78.9	=			670	
F620SB006	04-Oct-1996	9.8	J			670	
F620SB007	09-Jan-1997	287	=			3,200	
F620SB008	09-Jan-1997	88.9	=			670	
F620SB008	15-Oct-1999	89.0	=			670	
F620SB009	10-Jan-1997	61.9	=			3,200	
F620SB010	17-Nov-1999	97.7	J			670	
F620SB011	16-Nov-1999	26.7	J			670	
F620SB012	16-Nov-1999	60.5	J			670	
F620SB013	16-Nov-1999	78.2	J			670	
F620SB014	16-Nov-1999	44	J			670	
F620SB017 ^c	06-Jun-2001	172	=			670	
F620SB018 ^c	06-Jun-2001	18,400	=			56	
F620SB022	10-Oct-2001	25.4	=			670	
F620SB023	10-Oct-2001	5.9	=			670	
F620SB024	10-Oct-2001	4.0	=			670	
F620SB025	10-Oct-2001	5.8	=			670	
F620SB026	10-Oct-2001	4.9	=			670	
F620SB027	10-Oct-2001	5.2	=			670	
F620SB028	10-Oct-2001	4.7	=			670	
F620SB029	10-Oct-2001	1.6	=			670	
F620SB030 ^c	10-Oct-2001	476	=			56	

TABLE 5-4
 COPC Refinement of Lead in Surface Soil
 RFI Report Addendum and IM Completion Report, SWMU 36/AOC 620, Zone F, Charleston Naval Complex

Station ID	Date Collected	Conc. (mg/kg)	Qual.	Unrestricted Land Use MCS ^a (mg/kg)	Industrial Land Use MCS ^a (mg/kg)	Area- specific SSL ^b (mg/kg)	Zones F & G Background Range (mg/kg)
F620SB031	10-Oct-2001	273	=	400	1,220	670	3.5 - 275
F620SB032 ^c	10-Oct-2001	1,500	=			56	
F620SB033 ^c	10-Oct-2001	430	=			56	
F620SB034 ^c	10-Oct-2001	106	=			56	
F620SB035 ^c	10-Oct-2001	770	=			670	
F620SB036 ^c	10-Oct-2001	570	=			3,200	
F620SB037 ^c	10-Oct-2001	2,350	=			3,200	
F620SB038 ^c	10-Oct-2001	952	=			3,200	
F620SB039	10-Oct-2001	145	=			3,200	
F620SB040	10-Oct-2001	93.5	=			3,200	
F620SB041	10-Oct-2001	737	=			3,200	
F620SB042	10-Oct-2001	2.8	=			3,200	
F620SB043	10-Oct-2001	632	=			3,200	
F620SB044	10-Oct-2001	224	=			3,200	
F620SB045	10-Oct-2001	239	=			3,200	
F620SB046	10-Oct-2001	195	=			3,200	
F620SB053	26-Nov-2001	153	=			670	
F620SB055	26-Nov-2001	3.1	=			670	
F620SB056	26-Nov-2001	2.7	=			670	
F620SB060	26-Nov-2001	406	=			3,200	
F620SB061	07-Feb-2002	39	=			3,200	
F620SB062	07-Feb-2002	94	=			3,200	
F620SB063	07-Feb-2002	70.5	=			3,200	
F620SB064	07-Feb-2002	209	=			3,200	
F620SB065	07-Feb-2002	3.26	=			3,200	
F620SB066	07-Feb-2002	5.94	=			3,200	
F620SB067	07-Feb-2002	4.18	=			3,200	
F620SB068	22-Nov-2002	110	J			3,200	

TABLE 5-4
 COPC Refinement of Lead in Surface Soil
RFI Report Addendum and IM Completion Report, SWMU 36/AOC 620, Zone F, Charleston Naval Complex

Station ID	Date Collected	Conc. (mg/kg)	Qual.	Unrestricted Land Use MCS ^a (mg/kg)	Industrial Land Use MCS ^a (mg/kg)	Area- specific SSL ^b (mg/kg)	Zones F & G Background Range (mg/kg)
F620SB069	22-Nov-2002	160	J	400	1,220	3,200	3.5 - 275
F620SB070	22-Nov-2002	180	J			3,200	
F620SB071	22-Nov-2002	1,100	J			3,200	
F620SB071	22-Nov-2002	140	J			3,200	
F620SB072	22-Nov-2002	156	=			3,200	
F620SB073	08-Jan-2003	111	=			3,200	
F620SB074	08-Jan-2003	1,410	=			3,200	
F620SB075	08-Jan-2003	193	=			3,200	
F620SB076	08-Jan-2003	419	=			3,200	
Mean Concentration before IM		586					
Mean Concentration after IM		189					
Maximum Concentration after IM		1,810		(mean surface concentration from location F620SB004)			
Mean Concentration in ½-acre exposure area, after IM		269					

Concentrations in bold and outlined within the table indicate an exceedance of the combined Zones F and G background range, and either the unrestricted land use media cleanup standard (MCS) or area-specific soil screening level (SSL).

^aMCS is from the *Phase II Interim Measure Work Plan; Soil Removal at Building 68, SWMU 36/AOC 620, Zone F* (CH2M-Jones, December 2001e).

^bArea-Specific SSL from the *Phase II Interim Measure Work Plan; Soil Removal at Building 68, SWMU 36/AOC 620, Zone F* (CH2M-Jones, 2001e).

^cSoil at this sample location was removed during interim measure (IM) activities.

^dSamples shown in italics were used to estimate exposure area concentrations.

= Chemical was detected at the concentration shown.

Conc. Concentration

J Chemical was detected at concentration below the method detection limit; the concentration is not known.

mg/kg Milligrams per kilogram

Qual. Qualifier

TABLE 5-5

COPC Refinement of BEQs and PCBs in Surface Soil

RFI Report Addendum and IM Completion Report, SWMU 36/AOC 620, Zone F, Charleston Naval Complex

		BEQs	Aroclor-1254		Aroclor-1260		
Units		(mg/kg)	(mg/kg)		(mg/kg)		
SSL (DAF=10) ^a		NL	0.55		NL		
Unrestricted Land Use RBC ^b		0.087	0.32		0.32		
Industrial Land Use RBC ^b		0.78	2.9		2.9		
Sitewide Reference Concentration ^c		1.304	NL		NL		
Station ID	Date Collected	Conc.	Qual.	Conc.	Qual.	Conc.	Qual.
F036SB001 ^d	09-Oct-1996	0.661	=	NA		NA	
F036SB002	08-Oct-1996	0.434	=	NA		NA	
F036SB003 ^d	09-Oct-1996	0.377	=	NA		NA	
F620SB001	16-Sep-1996	0.283	=	0.080	U	0.056	UJ
F620SB002	27-Aug-1996	0.439	U	0.078	U	0.078	U
F620SB003	16-Sep-1996	0.446	=	0.075	U	0.24	J
F620SB004	10-Sep-1996	0.385	=	0.35	=	0.51	=
F620SB005	16-Sep-1996	NA		0.11	U	0.11	U
F620SB006	04-Oct-1996	0.485	U	NA		NA	
F620SB007	09-Jan-1997	0.31	=	0.077	U	0.055	U
F620SB008	09-Jan-1997	1.173	=	0.09	U	0.09	U
F620SB008	15-Oct-1999	0.347	=	0.036	U	0.088	=
F620SB009	10-Jan-1997	0.419	=	0.077	UJ	0.077	UJ
F620SB010	15-Oct-1999	NA		0.05	U	0.05	U
F620SB011	15-Oct-1999	NA		0.036	U	0.036	U
F620SB012	15-Oct-1999	1.733	U	NA		NA	
F620SB013	15-Oct-1999	0.373	=	NA		NA	
F620SB014	15-Oct-1999	0.416	U	NA		NA	
F620SB015	06-Jun-2001	NA		0.212	U	0.212	U
F620SB016	06-Jun-2001	NA		0.233	=	0.046	J
F620SB017 ^d	06-Jun-2001	1.683	=	0.077	U	0.077	U
F620SB018 ^d	06-Jun-2001	1.023	=	0.084	U	0.084	U
F620SB019	06-Jun-2001	NA		1.12	=	0.293	=
F620SB020	06-Jun-2001	NA		0.077	U	0.077	U
F620SB021	06-Jun-2001	NA		0.46	=	0.117	=

TABLE 5-5
 COPC Refinement of BEQs and PCBs in Surface Soil
RFI Report Addendum and IM Completion Report, SWMU 36/AOC 620, Zone F, Charleston Naval Complex

	BEQs	Aroclor-1254	Aroclor-1260
Units	(mg/kg)	(mg/kg)	(mg/kg)
SSL (DAF=10) ^a	NL	0.55	NL
Unrestricted Land Use RBC ^b	0.087	0.32	0.32
Industrial Land Use RBC ^b	0.78	2.9	2.9
Sitewide Reference Concentration ^c	1.304	NL	NL

Station ID	Date Collected	Conc.	Qual.	Conc.	Qual.	Conc.	Qual.
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Concentrations in bold and outlined within the table indicate an exceedance of the background concentration and EPA Region III risk-based concentration (RBC) or soil screening level (SSL) based on a dilution attenuation factor (DAF)=10.

^aSSL is from EPA Region III RBC Table (October 5, 2000).

^bRBC is from EPA Region III RBC Table (October 5, 2000).

^cSitewide reference concentration for BEQs is from *Background PAHs Study Report: Technical Information for Development of Background BEQ Values* (CH2M-Jones, 2001b).

^dSoil at these sample locations were removed during interim measure (IM) activities.

= Chemical was detected at the concentration shown.

Conc. Concentration

J Chemical was detected at concentration below the method detection limit; the concentration is not known.

mg/kg Milligrams per kilogram

NA Not analyzed/not available

NL Not listed

Qual. Qualifier

U Chemical was not detected; the reported value is the detection limit.

UU Chemical was not detected; the reported value is an estimated detection limit.

TABLE 5-6
 COPC Refinement of Selected Metals and 4-Methylphenol in Subsurface Soil
 RFI Report Addendum and IM Completion Report, SWMU 36/AOC 620, Zone F, Charleston Naval Complex

		Antimony		Chromium		Mercury		4-Methylphenol	
Units		(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)	
SSL (DAF=10) ^a		2.5		19		1		0.69 ^b	
Zones F & G Background Range		ND		7.4 - 65		0.04 - 0.57		NA	
Station ID	Date Collected	Conc.	Qual.	Conc.	Qual.	Conc.	Qual.	Conc.	Qual.
F036SB001 ^c	09-Oct-1996	0.57	UJ	57.9	=	0.39	J	2.2	=
F620SB005	16-Sep-1996	0.58	UJ	33.3	=	0.32	=	NA	
F620SB006	04-Oct-1996	0.44	UJ	20.8	J	0.46	=	0.48	U
F620SB007	09-Jan-1997	1.3	J	141	J	0.52	=	0.57	U
F620SB008	09-Jan-1997	1.2	J	15.8	J	0.18	=	0.45	U
F620SB008	15-Oct-1999	2.5	J	269	J	0.7	=	0.48	U
F620SB009	10-Jan-1997	0.36	UJ	8.1	J	0.17	=	0.4	U
F620SB010	17-Nov-1999	NA		6.4	J	0.04	UJ	NA	
F620SB011	16-Nov-1999	NA		12.9	J	0.07	J	NA	
F620SB012	15-Oct-1999	NA		NA		NA		1.9	U
F620SB013	15-Oct-1999	NA		NA		NA		0.48	U
F620SB014	15-Oct-1999	NA		NA		NA		0.38	U
F620SB017 ^c	06-Jun-2001	1.11	J	44	=	4.32	=	NA	
F620SB018 ^c	06-Jun-2001	2.09	J	31.5	=	3.48	=	NA	
F620SB022	10-Oct-2001	NA		NA		0.101	=	NA	
F620SB034 ^c	10-Oct-2001	NA		NA		0.576	=	NA	
F620SB053	26-Nov-2001	NA		NA		1.52	=	NA	
LG037SP002	10-Jun-1997	1.74	U	25.5	=	0.079	=	NA	
LF037SP030	11-Jun-1997	1.78	U	20.8	=	0.641	=	NA	
LF699SP001	11-Jun-1997	2.67	=	81.4	=	0.856	=	NA	
LF699SP002	10-Jun-1997	4.28	=	67.6	=	0.296	=	NA	
Mean Concentration before IM ^d		1.34		49.5		0.84		0.57	
Mean Concentration after IM		1.39		50.9		0.42		None	

Concentrations in bold and outlined within the table indicate an exceedance of the Zones F and G background concentration range and the soil screening level (SSL) (dilution attenuation factor [DAF]=10).

^aSSL (DAF=10) is from the EPA *Soil Screening Guidance: Technical Background Document*, Appendix A, Table A-1 (1996).

^bSSL (DAF=10) for 4-methylphenol is from the *Zone F RFI Report, Revision 0* (EnSafe, 1997).

^cIndicates that the shaded samples were removed during interim measure (IM) activities.

TABLE 5-6
 COPC Refinement of Selected Metals and 4-Methylphenol in Subsurface Soil
RFI Report Addendum and IM Completion Report, SWMU 36/AOC 620, Zone F, Charleston Naval Complex

		Antimony		Chromium		Mercury		4-Methylphenol	
Units		(mg/kg)		(mg/kg)		(mg/kg)		(mg/kg)	
SSL (DAF=10) ^a		2.5		19		1		0.69 ^b	
Zones F & G Background Range		ND		7.4 - 65		0.04 - 0.57		NA	
Station ID	Date Collected	Conc.	Qual.	Conc.	Qual.	Conc.	Qual.	Conc.	Qual.

^dMean concentration calculated using one-half the reported detection limit for non-detected data.

= Chemical was detected at the concentration shown.

Conc. Concentration

J Chemical was detected at concentration below the method detection limit; the concentration is not known.

mg/kg Milligrams per kilogram

NA Not analyzed/not available

Qual. Qualifier

U Chemical was not detected; the reported value is the detection limit.

UJ Chemical was not detected; the reported value is an estimated detection limit.

TABLE 5-7

COPC Refinement of Lead in Subsurface Soil

RFI Report Addendum and IM Completion Report, SWMU 36/AOC 620, Zone F, Charleston Naval Complex

Station ID	Date Collected	Concentration (mg/kg)	Qualifier	Area-specific SSL ^a	Zones F & G Background Range
F036SB001 ^b	09-Oct-1996	127	=	3,200	2.4 - 123
F620SB005	16-Sep-1996	58.3	=	670	
F620SB006	04-Oct-1996	34	J	670	
F620SB007 ^c	09-Jan-1997	57.3	=	3,200	
F620SB008	09-Jan-1997	51.6	=	670	
F620SB008	15-Oct-1999	105	J	670	
F620SB009	10-Jan-1997	5.3	=	3,200	
F620SB010	17-Nov-1999	4.9	J	670	
F620SB011	16-Nov-1999	18.2	J	670	
F620SB012	15-Oct-1999	82.8	J	670	
F620SB013	15-Oct-1999	88.3	J	670	
F620SB014	15-Oct-1999	27.9	J	670	
F620SB017 ^b	06-Jun-2001	236	=	670	
F620SB018 ^b	06-Jun-2001	1,350	=	56	
F620SB022	10-Oct-2001	157	=	670	
F620SB023	10-Oct-2001	13.3	=	670	
F620SB024	10-Oct-2001	3.1	=	670	
F620SB026	10-Oct-2001	5.6	=	670	
F620SB027	10-Oct-2001	7.9	=	670	
F620SB028	10-Oct-2001	6.2	=	670	
F620SB032 ^b	10-Oct-2001	1,120	=	56	
F620SB033 ^b	10-Oct-2001	416	=	56	
F620SB034 ^b	10-Oct-2001	1,100	=	56	
F620SB035 ^b	10-Oct-2001	303	=	670	
F620SB036 ^b	10-Oct-2001	3,880	=	3,200	
F620SB037 ^b	10-Oct-2001	497	=	3,200	
F620SB038 ^b	10-Oct-2001	3,270	=	3,200	
F620SB039	10-Oct-2001	242	=	3,200	
F620SB040	10-Oct-2001	57.5	=	3,200	
F620SB041	10-Oct-2001	94.8	=	3,200	

TABLE 5-7
 COPC Refinement of Lead in Subsurface Soil
 RFI Report Addendum and IM Completion Report, SWMU 36/AOC 620, Zone F, Charleston Naval Complex

Station ID	Date Collected	Concentration (mg/kg)	Qualifier	Area-specific SSL ^a	Zones F & G Background Range
F620SB042	10-Oct-2001	295	=	3,200	2.4 - 123
F620SB043	10-Oct-2001	736	=	3,200	
F620SB044	10-Oct-2001	376	=	3,200	
F620SB045	10-Oct-2001	159	=	3,200	
F620SB046	10-Oct-2001	137	=	3,200	
F620SB053	26-Nov-2001	97.8	=	670	
F620SB055	26-Nov-2001	63.1	=	670	
F620SB056	26-Nov-2001	2.7	=	670	
F620SB060	26-Nov-2001	40.7	=	3,200	
F620SB061	07-Feb-2002	33.7	=	3,200	
F620SB062	07-Feb-2002	66.8	=	3,200	
F620SB063	07-Feb-2002	106	=	3,200	
F620SB064	07-Feb-2002	14.8	=	3,200	
F620SB065	07-Feb-2002	4.84	=	3,200	
F620SB066	07-Feb-2002	11.4	=	3,200	
F620SB067	07-Feb-2002	6.76	=	3,200	
F620SB073	08-Jan-2003	395	=	3,200	
F620SB074	08-Jan-2003	2,440	=	3,200	
F620SB075	08-Jan-2003	3,760	=	3,200	
F620SB076	08-Jan-2003	1,230	=	3,200	
LG037SP002	10-Jun-1997	85.5	=	670	
LF037SP030	11-Jun-1997	140	=	670	
LF699SP001	11-Jun-1997	153	=	3,200	
LF699SP002	10-Jun-1997	167	=	670	
Mean Concentration before IM		431			
Mean Concentration after IM		245			
Maximum Concentration after IM		3,760			
Mean Concentration in 1/2 acre exposure area, after IM		337			

Concentrations in bold and outlined within the table indicate an exceedance of the Zones F and G background concentration range and the soil screening level (SSL).

TABLE 5-7

COPC Refinement of Lead in Subsurface Soil

RFI Report Addendum and IM Completion Report, SWMU 36/AOC 620, Zone F, Charleston Naval Complex

Station ID	Date Collected	Concentration (mg/kg)	Qualifier	Area-specific SSL ^a	Zones F & G Background Range
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^aArea-Specific SSL is from the *Phase II Interim Measure Work Plan; Soil Removal at Building 68* (CH2M-Jones, 2001e).

^bIndicates that the sample was removed during interim measure (IM) activities.

^cSamples shown in *italics* were used to estimate the exposure area concentrations.

= Chemical was detected at the concentration shown.

J Chemical was detected at concentration below the method detection limit; the concentration is not known.

mg/kg Milligrams per kilogram

TABLE 5-8

COPC Refinement of Barium, Lead, and Thallium in Groundwater

RFI Report Addendum and IM Completion Report, SWMU 36/AOC 620, Zone F, Charleston Naval Complex

		Barium		Lead		Thallium	
	Units	($\mu\text{g/L}$)		($\mu\text{g/L}$)		($\mu\text{g/L}$)	
	MCL	2,000		15		2	
	Zone E BRC	211		4.8		5.4	
	Zone F BRC	94.3		ND		5.58	
	Zone G BRC	31		4.6		ND	
	Zones E, F, & G Background Range	6 - 937		2 - 52		3 - 6	
Station ID	Date Collected	Conc.	Qual.	Conc.	Qual.	Conc.	Qual.
F620GW001	08-Nov-96	460	=	4.6	=	11	=
	09-May-97	525	=	0.9	U	6.6	U
	29-Aug-97	701	J	0.9	U	5	U
	19-Nov-97	317	J	4.1	U	5	U
F620GW002	04-Nov-96	18.3	=	1.7	U	2.8	J
	12-May-97	31.2	=	0.9	U	5	U
	29-Aug-97	42.3	J	0.9	U	5	U
	17-Nov-97	28.7	=	1.8	U	5	U
	11-Oct-01	NA		2.43	U	NA	
F620GW003	01-May-97	32.9	=	0.9	U	5.2	J
	02-Sep-97	67.2	=	1.1	U	4.6	U
	17-Nov-97	57.4	=	1.5	U	5	U
	11-Feb-98	1,770	J	3	J	5	U
F620GW004	30-Apr-97	21	=	30.7	=	5	U
	02-Sep-97	55.5	=	4.5	U	4.6	U
	19-Nov-97	37.2	J	4.3	U	5	U
	11-Feb-98	20.2	J	2.9	J	5	U
	11-Oct-01	NA		3.56	U	NA	

Bolded and outlined values are exceedances of background reference concentrations (BRCs) and MCLs.

^aMaximum Contaminant Level (MCL) obtained from EPA National Primary Drinking Water Standards (03/2001).

= Chemical was detected at the concentration shown.

Conc. Concentration

J Chemical was detected at concentration below the method detection limit; the concentration is not known.

NA Not analyzed/not available

ND Not detected

Qual. Qualifier

U Chemical was not detected; the reported value is the detection limit.

NOTE: Original figure created in color

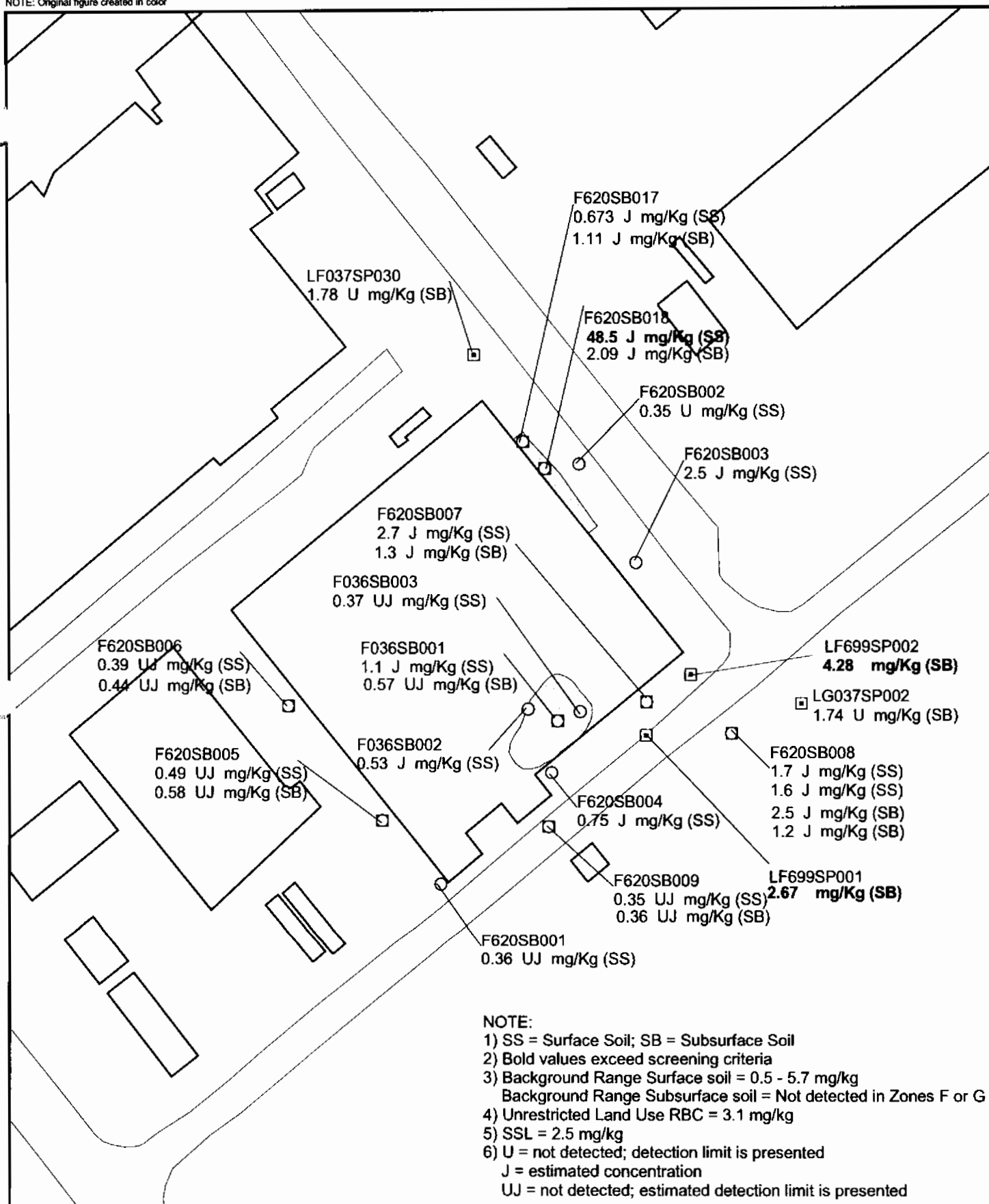
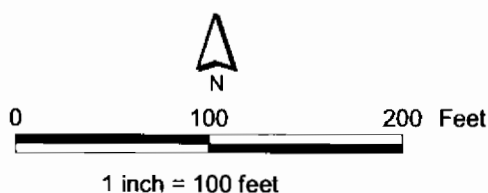


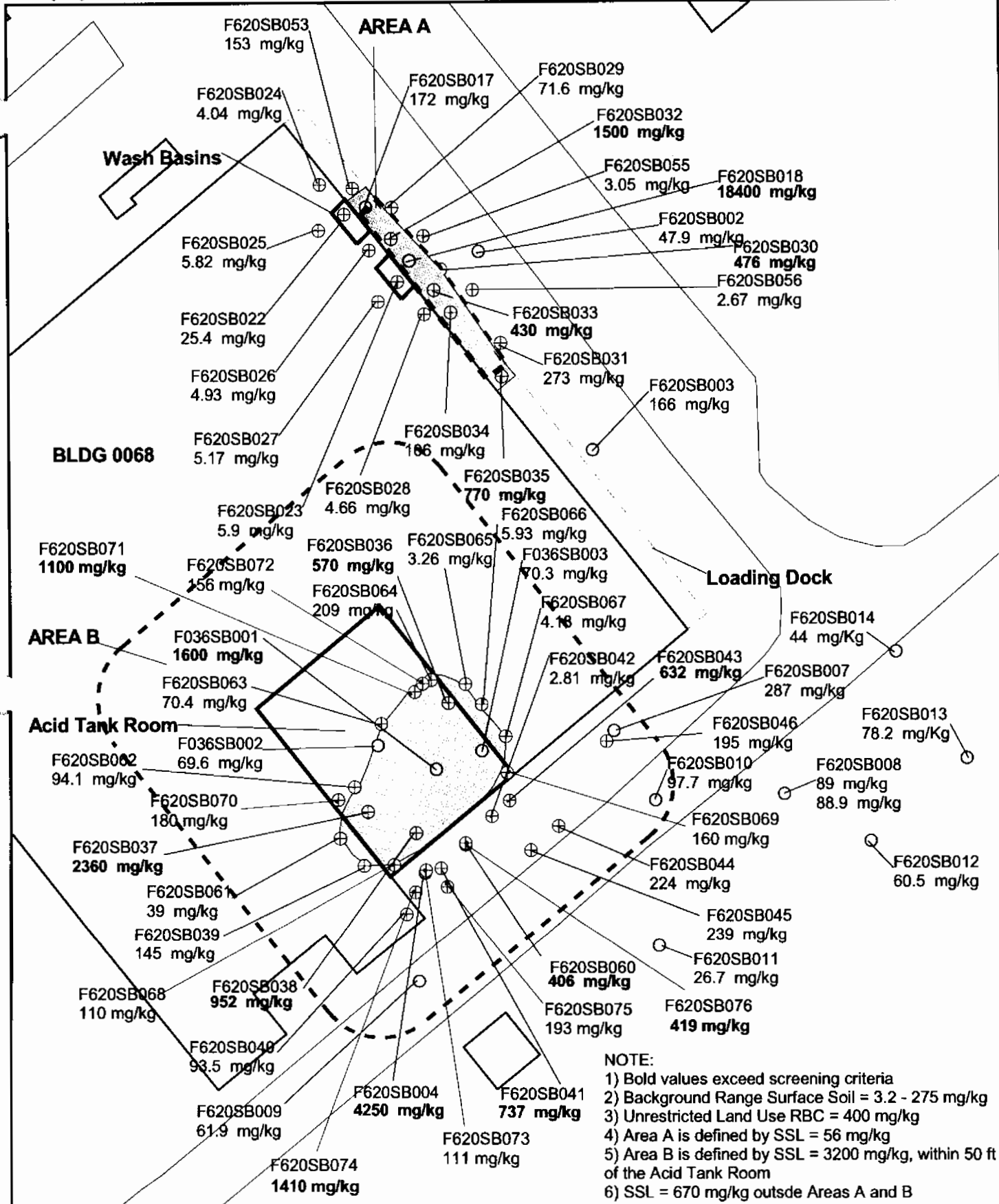
Figure 5-1
Antimony in Soil
AOC 620 - Zone F
Charleston Naval Complex

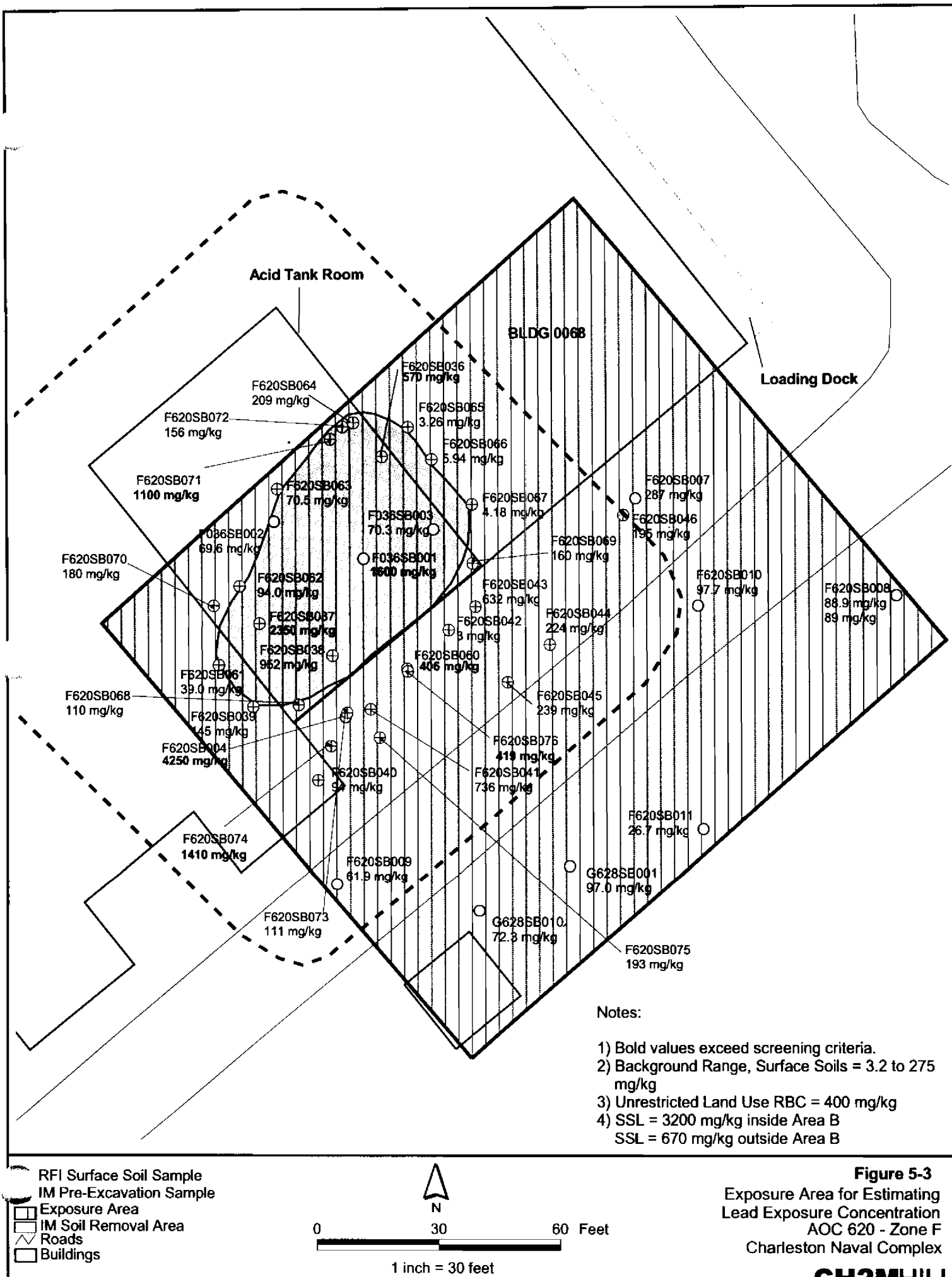
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- Subsurface Soil
- ▣ Soil Probe
- ▭ IM Soil Removal
- ~ Roads
- ▭ Buildings



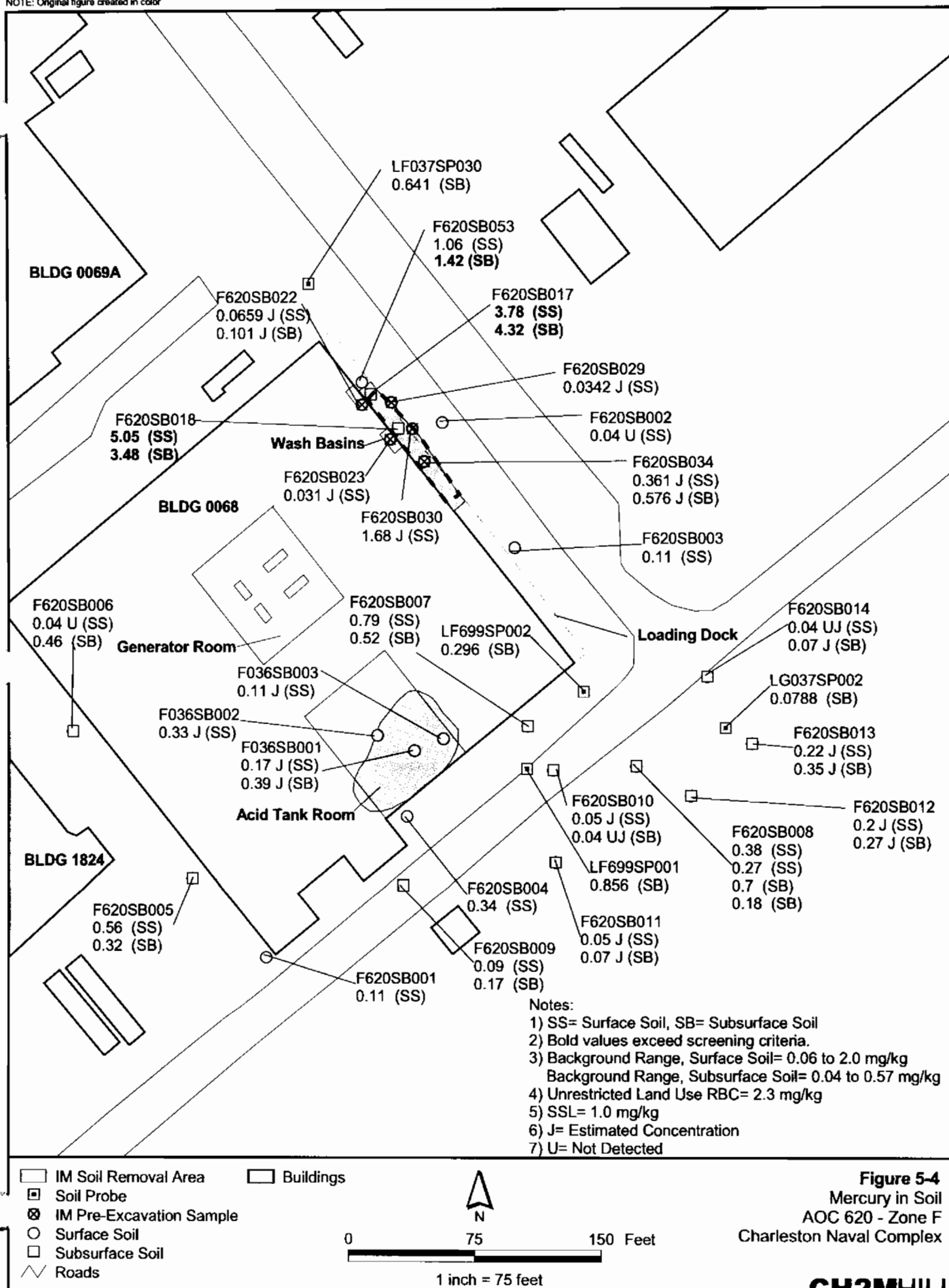
CH2MHILL

NOTE: Original figure created in color

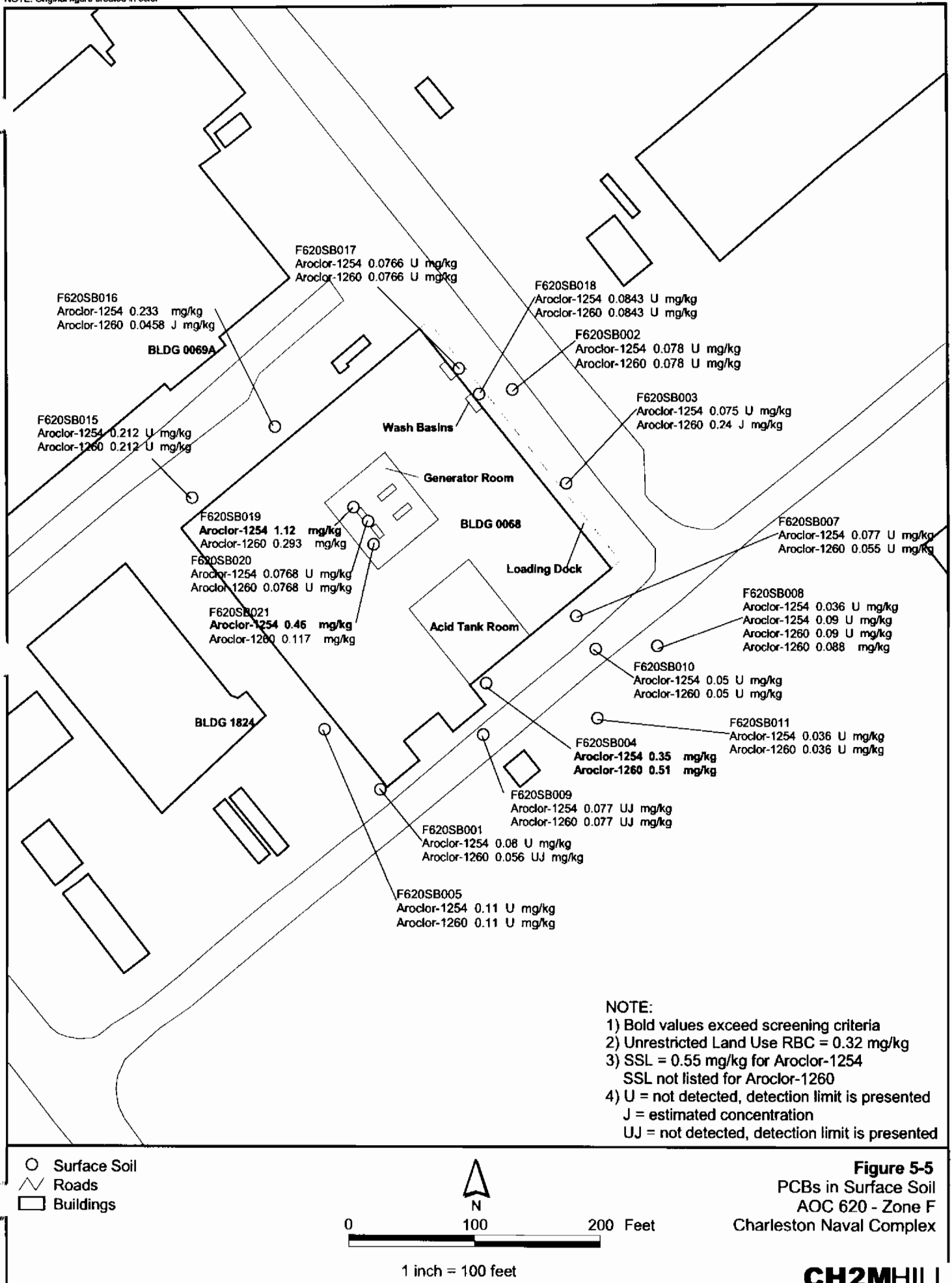




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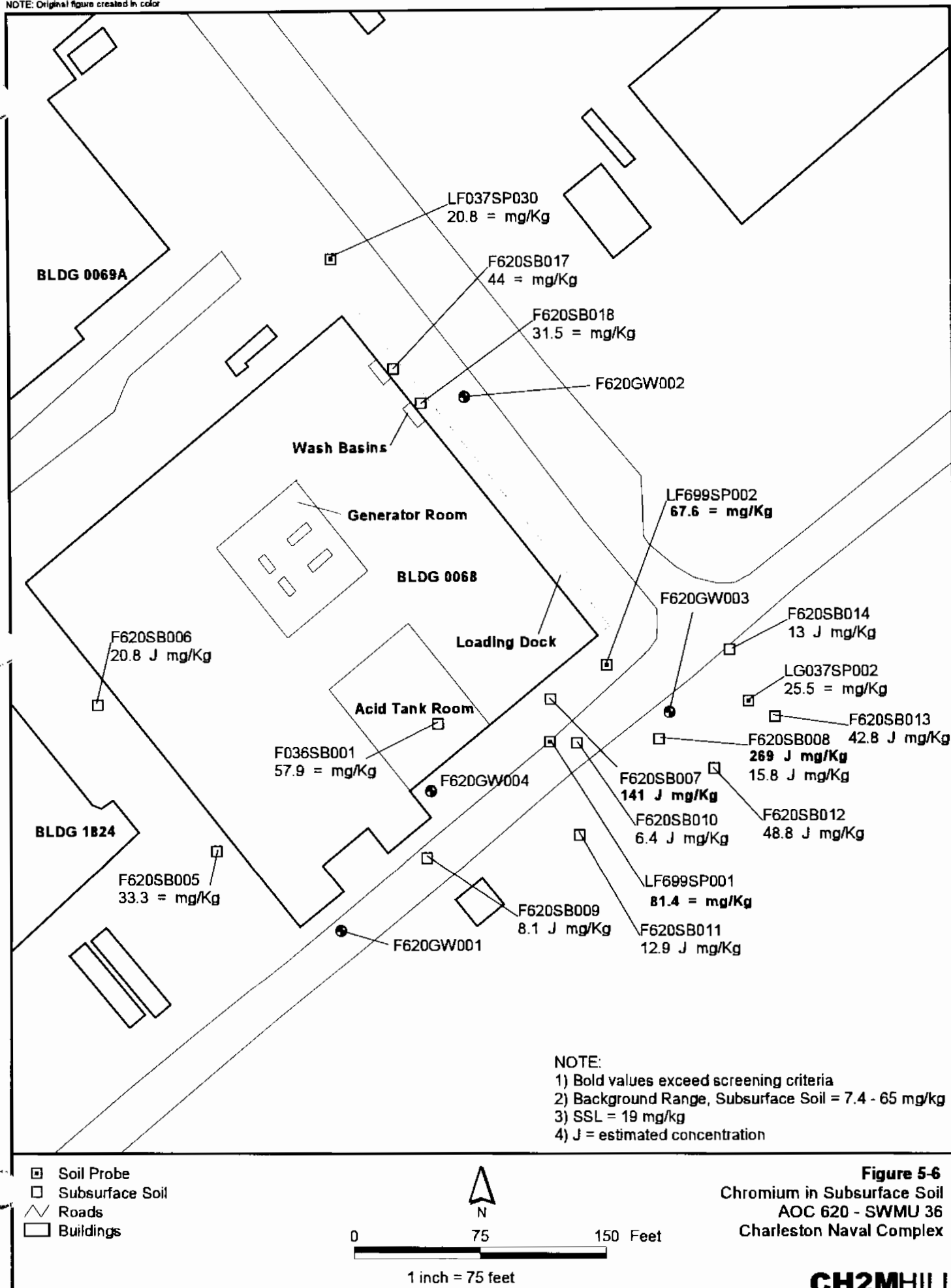
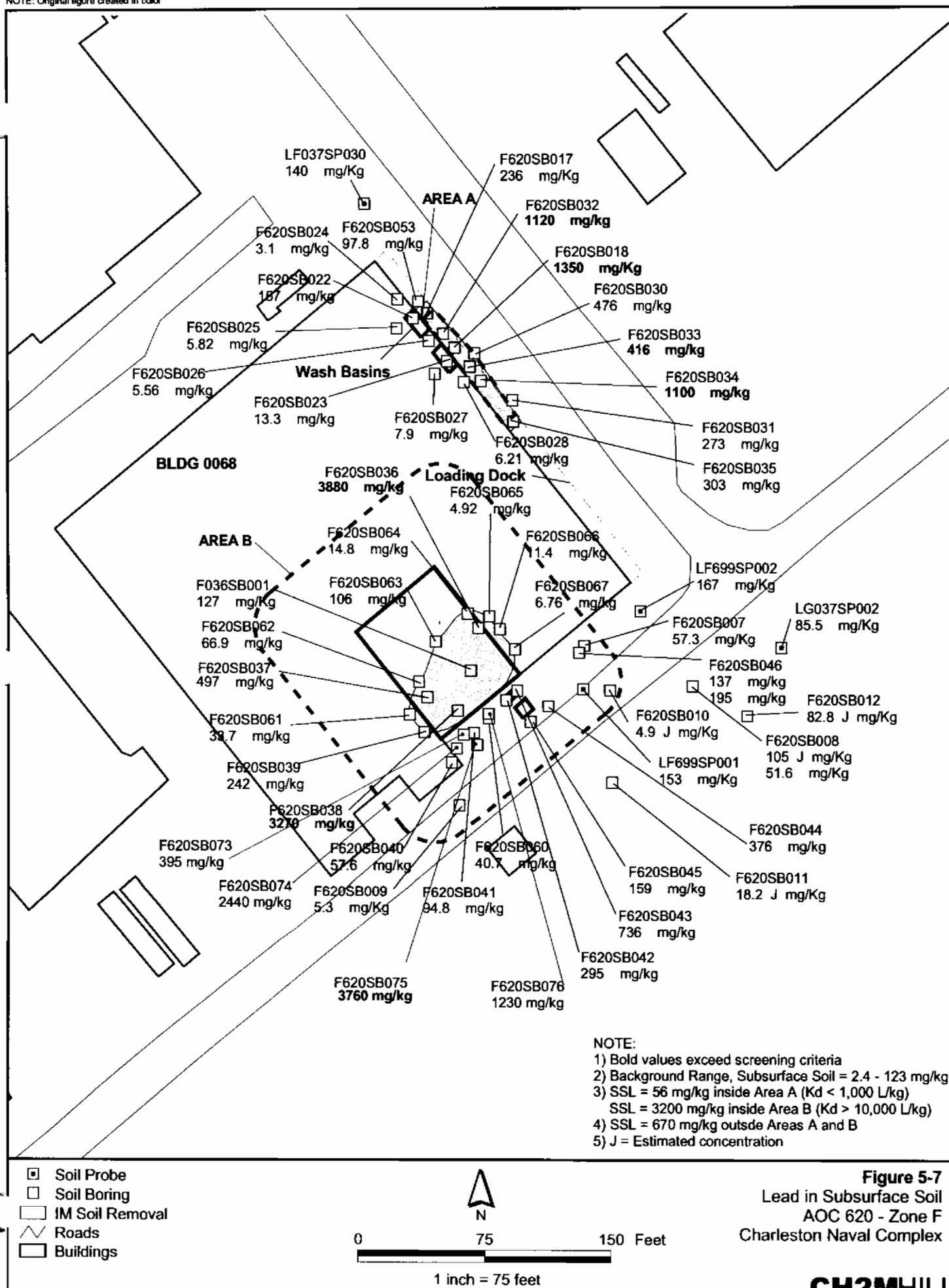


Figure 5-6
Chromium in Subsurface Soil
AOC 620 - SWMU 36
Charleston Naval Complex

NOTE: Original figure created in color



6.0 Summary of Information Related to Site Closeout Issues

6.1 Presence of Inorganics in Groundwater

For the purpose of site closeout documentation, the inorganics in groundwater issue refers to the occasional or intermittent detection of several metals (primarily arsenic, thallium, and antimony) in groundwater at concentrations above the applicable MCL, preceded or followed by detections of these same metals below the MCL, or below the practicable quantitation limit.

Thallium was detected during the first sampling events at monitoring wells at SWMU 36/AOC 620, but was not detected in subsequent events. Thallium was discussed in Section 5.0, and is not considered a COC at this site. Neither arsenic nor antimony were detected in any groundwater samples from the site at concentrations above their MCLs. No further evaluation or corrective action for groundwater at this site is warranted.

6.2 Potential Linkage to Sanitary Sewers (SWMU 37)

COCs have not been identified in soil and groundwater samples collected for the SWMU 37 RFI in the vicinity of SWMU 36/AOC 620. Industrial waste discharges from Building 68 were not directed to the sanitary sewer system. Therefore, there is no known linkage between SWMU 36/AOC 620 and the sanitary sewers, and no data indicate that this site has likely impacted the sanitary sewer system. Further evaluation of this issue is not warranted.

6.3 Potential Linkage to Storm Sewers (AOC 699)

Potential linkage of a SWMU or AOC to the storm sewer refers to the possibility of a groundwater plume migrating into a stormwater sewer from within which it would subsequently migrate to the water bodies around the CNC, or to the presence of a cross connection between the sanitary sewer and storm sewer, which could transport pollutants directly to surface waters.

No COCs have been identified in groundwater at SWMU 36/AOC 620. The IM removed lead-impacted soil to avoid potential future lead migration to groundwater. As a result, there is no reason to suspect that SWMU 36/AOC 620 has or will impact the storm sewer system.

6.4 Potential Linkage to Railroad Lines (AOC 504)

Several railroad lines transected the SWMU 36/ AOC 620 investigated area. It is possible that some of the elevated metals concentrations observed near these railroad lines, specifically at sample location F620SB008, are the result of the presence of the railroad lines. However, no COCs have been identified that are linked to the railroad lines. Further evaluation of this issue is not warranted.

6.5 Potential Migration Pathways to Surface Water Bodies

Surface water was studied separately as part of the *Zone J RFI Report, Revision 0* (EnSafe, 2000). The *Zone J RFI Report, Revision 0* includes the investigated surface water bodies. The nearest investigated surface water body to SWMU 36/ AOC 620 is the Cooper River, which is approximately 700 feet east of the site.

There are two possible migration pathways for contaminants to affect surface water: overland flow via stormwater runoff, and subsurface flow via groundwater. Stormwater at Building 68 is directed to catch basins surrounding the building, which discharge to Outfall 41. The majority of the surface soil contamination that existed before the IM was not exposed to runoff, and there is no reason to suspect that there was contaminant migration to the storm sewer system. Therefore, further evaluation of a potential pathway for contaminant migration via stormwater runoff is not warranted.

No COCs have been identified in the groundwater at SWMU 36/ AOC 620. Therefore, further evaluation of a potential contaminant migration via groundwater migration is not warranted at SWMU 36/ AOC 620.

6.6 Potential Contamination in Oil/Water Separators

The potential contamination of OWSs issue refers to the possible presence of an OWS that has not yet been investigated at a SWMU or AOC as part of the RCRA or UST process.

Neither the RFA nor the *Zone F RFI Report, Revision 0* refers to the presence or possible presence of an OWS at SWMU 36/ AOC 620. Additionally, there is no reference to an OWS at this facility in the basewide OWS report prepared by the Navy for Y2000 (Hunt, 2000). Therefore, further evaluation of this issue at SWMU 36/ AOC 620 is not warranted.

6.7 Land Use Controls (LUCs)

With the completion of the IM at SWMU 36/AOC 620, which removed lead- and mercury-impacted soils to levels that would allow the site to be classified for unrestricted (i.e., residential) land use, LUCs are not expected to be necessary at the site. However, because specific isolated locations at the site contain lead in surface and near-surface soil above the unrestricted land use criteria, it is recommended that the LUCs planned for the industrial area of the CNC be inclusive of AOC 620, and that the site be restricted for industrial or commercial usage.

7.0 Interim Measure Completion Report

The IM at SWMU 36/ AOC 620 was conducted in the following four phases:

- Phase I – Pre-excavation sampling
- Phase II – Soil removal in Wash Basin Area
- Phase III – Additional soil removal in Acid Tank Room Area, following demolition of Building 68
- Phase IV – Additional sampling near the Acid Tank Room Area

The Phase I pre-excavation sampling was conducted in accordance with the *Phase I Interim Measure Work Plan, Pre-Excavation Sampling and Analysis Plan, AOC 620/SWMU 36, Zone F* (CH2M-Jones, 2001c). The Phase II IM was conducted in accordance with *Phase II Interim Measure Work Plan, Soil Removal at Building 68, AOC 620/SWMU 36, Zone F* (CH2M-Jones, 2001e). The Phase III IM was conducted in accordance with *Phase III Interim Measure Work Plan, Additional Soil Removal in Acid Tank Room Area, AOC 620/SWMU 36, Zone F* (CH2M-Jones, 2002a). The Phase IV IM sampling was conducted in accordance with the Technical Memorandum AOC 620; *Phase IV Interim Measure Soil Removal* (CH2M-Jones, 2002b). The first three IM Work Plans presented soil data and delineated areas with elevated lead, presented derivations of the area-specific SSLs at AOC 620, and provided details pertaining to performance of the IM excavation. Each of the three work plans was approved by the SCDHEC. The fourth IM Work Plan proposed additional sampling to evaluate the need for further soil removal, and proposed an additional soil removal area if the lead concentrations warranted further soil remediation.

7.1 Interim Measure Soil Delineation

The Phase I pre-excavation soil and groundwater sampling has been included in the data evaluation discussion in Sections 4.0 and 5.0 of this RFIRA/IMCR. As a result of SPLP sampling, distinct areas with differing soil lead partitioning coefficients were identified within AOC 620. These are discussed in the Phase II IM Work Plan, a copy of which is presented in Appendix F.

The MCS for lead-impacted soil was established in the Phase II IM Work Plan as 400 mg/kg for unrestricted (i.e., residential) land use and 1,220 mg/kg for industrial land use. In addition, the exposure concentration at AOC 620 (for lead, the average concentration in an

exposure area) is to be less than the area-specific SSL, which is derived from the area-specific partitioning coefficient. Note that it is possible for individual soil samples within the site to exceed the MCS or SSL, provided that the average concentration for the exposure unit is below the criteria.

Target excavation areas proposed in the Phase II and Phase III IM Work Plans are presented in Figures 7-1 and 7-2, for the wash basin area and acid tank room area, respectively. Lead concentrations in the soil beneath the loading dock in the wash basin area exceeded the remediation criteria, and lead concentrations beneath the wash basins themselves were within cleanup levels. In the acid tank room area, surface and subsurface soil lead concentrations above the cleanup criteria were located primarily beneath the acid tank room. However, the presence of tanks and other equipment in the acid tank room, along with the structural members of the building, prevented remediation of the soil beneath the acid tank room until the building was removed.

7.2 Phase II IM– Wash Basin Area

7.2.1 Soil Excavation

The excavation of soil from the wash basin area, which is beneath the loading dock, was initiated on March 4, 2002. The loading dock was removed 2.5 feet from the building to the outer edge of the dock, to avoid contact with a pipeline that potentially contained asbestos. The soil beneath the loading dock was excavated below the ledge, up to the wall line of the building and slightly beyond the outside limits of the loading dock, as shown in Figure 7-3. Appendix H presents photographs from the excavation and backfilling operations. The soil was removed down to the groundwater level of approximately 3.5 ft bls. Approximately 105 tons of lead-impacted soil were removed from the wash basin area.

The excavation was backfilled with clean fill obtained from the O. L. Thompson pit in Mt. Pleasant, South Carolina. The backfill was graded to match the existing grade. The analytical data on the borrow source material is included in Appendix I of this RFIRA/IMCR.

7.2.2 Waste Characterization Sampling

Samples from beneath the loading dock were analyzed to determine if the excavated material was hazardous by characteristic. Four composite samples were collected from soil beneath the loading dock during the Phase I pre-excavation sampling. The samples were analyzed for toxicity characteristic leaching procedure (TCLP) analysis for lead.

1 During the pre-excavation sampling effort, composite surface soil and subsurface soil
2 samples were collected from the northern half and the southern half of the excavation-area
3 soil. The results of these analyses are presented in Table 7-1. The two samples from the
4 southern half of the excavation area had lead TCLP results at less than the regulatory limit
5 of 5 mg/L (40 CFR 261), and were judged to be non-hazardous. The composite surface soil
6 sample from the northern half of the excavation area, where the greatest concentrations of
7 lead were detected, had a lead TCLP result of 31.2 mg/L, and was assumed hazardous. The
8 subsurface soil from the same location tested non-hazardous.

9 On the basis of the pre-excavation waste characterization sampling, the three individual
10 roll-off boxes of excavated soil from the northern and central sections of the excavated area
11 were also sampled for TCLP. In addition, a composite sample was collected from the
12 containers holding soil from the southern section of the excavation. The TCLP extract was
13 analyzed for the eight RCRA metals. A summary of the analytical results from the post-
14 excavation waste characterization sampling is presented in Table 7-2. The soil from the
15 southern half of the excavation was again determined to be non-hazardous, while the soil
16 from the northern portion of the excavation had lead in the leachate in excess of the
17 regulatory limit and was determined to be hazardous.

18 Approximately 50 tons of non-hazardous soil were disposed of at Oakridge Landfill in
19 Dorchester, South Carolina. Approximately 55 tons of soil were treated at Envirite of Ohio,
20 Inc. and rendered non-hazardous. Waste manifests and load tickets are included in
21 Appendix J.

22 **7.3 Phase III IM – Acid Tank Room Area**

23 **7.3.1 Post-Demolition Sampling**

24 After the building was demolished, allowing access to the soils beneath the acid tank room,
25 four confirmation surface soil samples were collected around the perimeter of the area
26 delineated as a result of the Phase I sampling effort, per the Phase III IM Work Plan. These
27 samples were collected to evaluate if the demolition process had shifted any lead-impacted
28 surface soils outside of the target area. Samples from soil boring locations F620SB068
29 through F620SB071 were analyzed for lead; their locations and concentrations are shown in
30 Figure 7-4 and the analytical results are presented in Table 7-3. These results were also
31 discussed in Sections 4.0 and 5.0 of this RFIRA/IMCR, and were used to estimate average
32 site and exposure area concentrations.

Samples F620SB068 through F620SB070 had lead concentrations ranging from 110 to 180 mg/kg, below the unrestricted land use MCS and similar to background concentrations in Zones F and G. The sample from F620SB071 reported a lead concentration of 1,100 mg/kg in surface soil, compared to the MCS of 1,220 mg/kg. However, the duplicate field sample collected at that same location had a lead concentration of 140 mg/kg, similar to the other site concentrations at the edge of the excavation area. Because the normal sample from F620SB071 had a lead concentration below but near the MCS, a fifth confirmation sample, F620SB072, was collected 5 feet to the northeast of F620SB071 (shown in Figure 7-4) to further evaluate the soil. A lead concentration of 156 mg/kg was reported in F620SB072, indicating the original sample from F620SB071 was an anomaly. Therefore, the soil was excavated to the limits described in the Phase III IM Work Plan.

7.3.2 Excavation

On December 2 and 3, 2002, after the acid tanks and supporting floor had been removed, the soil delineated from the acid tank room area was excavated to the limits shown in Figure 7-4. Appendix H presents photographs from the excavation and backfilling operations.

Soil was removed down to the groundwater level of approximately 5 ft bls at the eastern half of the excavation, and 4 ft bls in the western half. Approximately 461 tons of lead-impacted soil were removed from the acid tank room area.

The excavation was backfilled with clean fill obtained from the Butler pit in Dorchester, South Carolina, and the O. L. Thompson pit in Mt. Pleasant, South Carolina. The backfill was graded to match the existing grade.

7.3.3 Waste Characterization Sampling

Before the building was demolished, samples from beneath the acid tank room were analyzed to determine if the excavated material was hazardous by characteristic. One composite subsurface soil sample and one discrete surface soil sample were collected from beneath the building floor during the Phase I pre-excavation sampling effort. These samples were collected at locations with total lead concentrations greater than 2,000 mg/kg. The samples were analyzed for TCLP analysis for lead. The results for the waste characterization samples, shown in Table 7-1, indicate that the extracted lead was below the appropriate regulatory level. Therefore, the soil from the acid tank room area is non-hazardous.

Approximately 461 tons of non-hazardous soil were disposed of at Oakridge Landfill in Dorchester, South Carolina. Waste manifests for the soil excavated are included in Appendix J.

7.4 Phase IV IM – Acid Tank Room Area Post-Demolition Sampling

The Phase III IM area specifically omitted the area immediately south of the acid tank room, outside the building, where elevated lead concentrations had been detected in soil during monitoring well F620GW004 construction in 1996. The area had been omitted from the Phase III IM excavation area because of the desire to keep the monitoring well in working condition, and because the average area-wide (½-acre) lead concentration would be within acceptable limits, even with the “hot spot” at the well location. However, the monitoring well was destroyed during Building 68 demolition, therefore allowing the opportunity to again evaluate if the soil “hot spot” should be remediated.

The Phase IV IM involved collecting additional surface and subsurface (1 to 2 ft bls) samples in the “hot spot” area and evaluating if the concentrations warranted additional soil removal. Samples F620SB073 through F620SB076 were collected as described in the Technical Memorandum AOC 620; *Phase IV Interim Measure Soil Removal* (CH2M-Jones, 2002b). The soil samples were analyzed for lead; their locations and results are shown in Figure 7-4, and the analytical results are presented in Table 7-3. These results were also discussed in Sections 4.0 and 5.0 of this report and were used to estimate average site and exposure area concentrations.

Sample F620SB076 was collected at the same location as the original sample F620SB004, which had a reported lead concentration of 4,250 mg/kg (with a duplicate sample at 1,070 mg/kg) in surface soil. Lead was detected at 111 mg/kg at F620SB076 in the surface soil, and at 395 mg/kg in the subsurface soil (1 to 2 ft bls). Although the recent data indicate that the location has lead below the MCS, to evaluate the area-wide lead concentration in Section 5.0 of this report, the average lead concentration at F620SB004 is estimated at 1,810 mg/kg (the average of the three analyses from the specific location).

The average lead concentration of the four Phase IV IM surface soil samples was calculated at 533 mg/kg. Therefore, it was concluded that there is no “hot spot” in surface soil in the area. Likewise, the average lead concentration in subsurface soil from the four Phase IV IM subsurface soil samples is 1,960 mg/kg, which is lower than the area-specific SSL of 3,200 mg/kg. Therefore, it was concluded that the average concentrations in the local area surrounding sample location F620SB004 meet MCSs and do not indicate the need for further remediation.

7.5 Interim Measure Conclusions

Samples collected prior to excavation were intended to provide information on the lateral and vertical extent of lead-impacted soil. They were also intended to serve as confirmation samples for the IM. The pre-excavation samples were adequate for delineating the extent of the soils that required removal.

As previously stated, the goal of the IM was to remove lead-impacted surface soils to levels that would allow the site to be classified for industrial land use. The information presented in Section 5.0 shows that the goal of the IM was achieved; in fact the average lead concentrations remaining at AOC 620 are within limits for unrestricted (i.e, residential) land use.

Based on the data presented, lead-impacted soil at SWMU 36/AOC 620 has been adequately remediated, and no further investigative or remedial actions are warranted at the site.

TABLE 7-1

Waste Characterization Data from Pre-Excavation Samples

RFI Report Addendum and IM Completion Report, SWMU 36/AOC 620, Zone F, Charleston Naval Complex

Sample Location	Soil Sample Type	TCLP (Pb) Leachate ^a (mg/L)	Qualifier	pH	Sample Location
F620SB054	Surface	31.2	=	5.8	Wash Basin Area, Beneath Loading Dock, North
(composite)	Subsurface	0.743	=	6.18	
F620SB057	Surface	0.273	=	6.95	Was Basin Area, Beneath Loading Dock, South
(composite)	Subsurface	0.084	J	6.57	
F620SB058	Subsurface	1.98	=	5.06	Acid Tank Area, Beneath Acid Tank Room
(composite)					
F620SB059	Surface	0.0172	U	4.85	
F620SB062	Surface			8.83	
	Subsurface			8.46	
F620SB063	Surface			4.92	
	Subsurface			7.56	

The concentration in bold type and outlined within the table exceeds the Toxicity Characteristic Leaching Procedure (TCLP) limit.

^aTCLP limit for Lead = 5 mg/L.

= Chemical was detected at the concentration shown.

J Chemical was detected at concentration below the method detection limit; the concentration is not known.

mg/L Milligrams per liter

Pb Lead

pH Hydrogen (ion) concentration

U Chemical was not detected; the reported value is the detection limit.

TABLE 7-2
 TCLP Analysis of Excavated Loading Dock Soil
 RFI Report Addendum and IM Completion Report, SWMU 36/AOC 620, Zone F, Charleston Naval Complex

Waste Sample Source	Leachate Analysis	Silver		Arsenic		Barium		Cadmium		Chromium		Mercury		Lead		Selenium	
	Units	mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L	
	TCLP Limit	5		5		100		1		5		0.2		5		1	
	Date Sampled	Conc.	Q	Conc.	Q	Conc.	Q	Conc.	Q	Conc.	Q	Conc.	Q	Conc.	Q	Conc.	Q
620VA001 Southern half of loading dock	03/07/2002	0.019	U	0.053	U	0.29	J	0.0071	U	0.017	U	0.0072	U	3.9	=	0.042	U
620VA002 Northern half of loading dock	03/07/2002	0.019	U	0.053	U	0.34	J	0.0078	U	0.017	U	0.0072	U	27	=	0.042	U
620VA003 Northern half of loading dock	03/07/2002	0.019	U	0.053	U	0.26	J	0.0071	U	0.017	U	0.0072	U	40	=	0.042	U
620VA004 Northern half of loading dock	03/07/2002	0.019	U	0.053	U	0.20	J	0.014	U	0.017	U	0.0072	U	9.2	=	0.042	U

Concentrations in bold type and outlined within the table indicate an exceedance of the Toxicity Characteristic Leaching Procedure (TCLP) limit.

= Chemical was detected at the concentration shown.

J Chemical was detected at concentration below the method detection limit; the concentration is not known.

mg/L Milligrams per liter

U Chemical was not detected; the reported value is the detection limit.

TABLE 7-3

Post-Demolition Confirmation Sampling; Acid Tank Area

RFI Report Addendum and IM Completion Report, SWMU 36/AOC 620, Zone F, Charleston Naval Complex

Analyte	Sample ID	Sample Depth (ft bls)	Concentration (mg/kg)	Qualifier	Date Collected	MCS ^a	Soil-to-Groundwater SSL ^b	Zones F & G Range of Background Concentrations ^c
Lead	620SB068	0 - 1	110	J	11/22/2002	1,220	3,200	3.5 - 275
	620SB069	0 - 1	160	J	11/22/2002			3.5 - 275
	620SB070	0 - 1	180	J	11/22/2002			3.5 - 275
	620SB071	0 - 1	1,100	J	11/22/2002			3.5 - 275
	620CB071 (duplicate)	0 - 1	140	J	11/22/2002			3.5 - 275
	620SB072	0 - 1	156	=	12/02/2002			3.5 - 275
	620SB073	0 - 1	111	=	01/08/2003			3.5 - 275
	620SB073	1 - 2	395	=	01/08/2003			2.4 - 123
	620SB074	0 - 1	1,410	=	01/08/2003			3.5 - 275
	620SB074	1 - 2	2,440	=	01/08/2003			2.4 - 123
	620CB074 (duplicate)	1 - 2	396	=	01/08/2003			2.4 - 123
	620SB075	0 - 1	193	=	01/08/2003			3.5 - 275
	620SB075	1 - 2	3,760	=	01/08/2003			2.4 - 123
	620SB076	0 - 1	419	=	01/08/2003			3.5 - 275
	620SB076	1 - 2	1,230	=	01/08/2003			2.4 - 123

Lead concentrations in bold and outlined within the table indicate an exceedance of the Zones F and G background concentration range, and the Media Cleanup Standard (MCS) or Soil Screening Level (SSL).

^aMCS from the *Phase II Interim Measure Work Plan; Soil Removal at Building 68* (CH2M-Jones, 2001e).

^bArea-Specific SSL from the *Phase II Interim Measure Work Plan; Soil Removal at Building 68* (CH2M-Jones, 2001e).

^cRange of background concentrations is combined for Zones F and G.

= Chemical was detected at the concentration shown.

ft bls Feet below land surface

J Chemical was detected at concentration below the method detection limit; the concentration is not known.

mg/kg Milligrams per kilogram

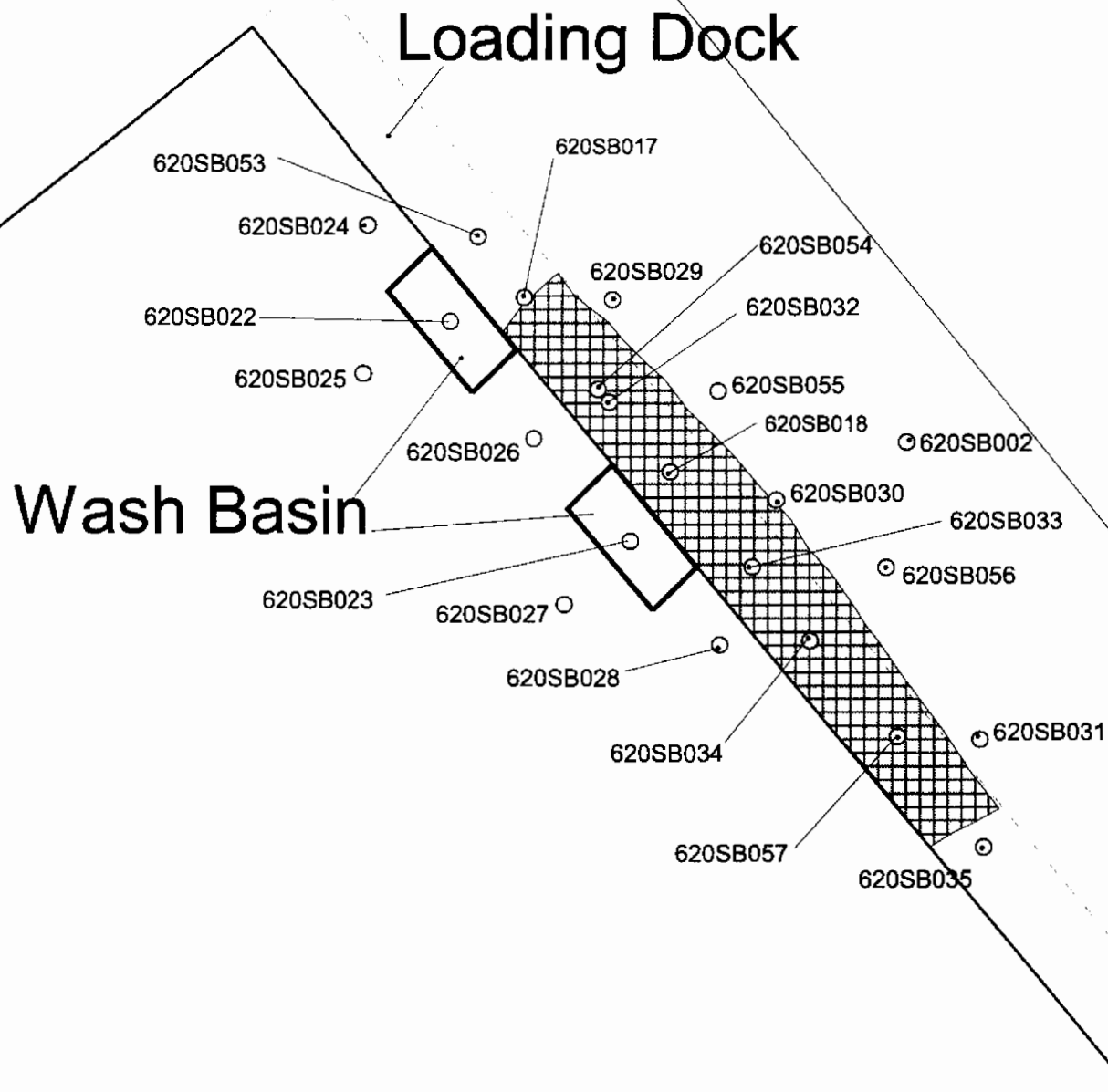
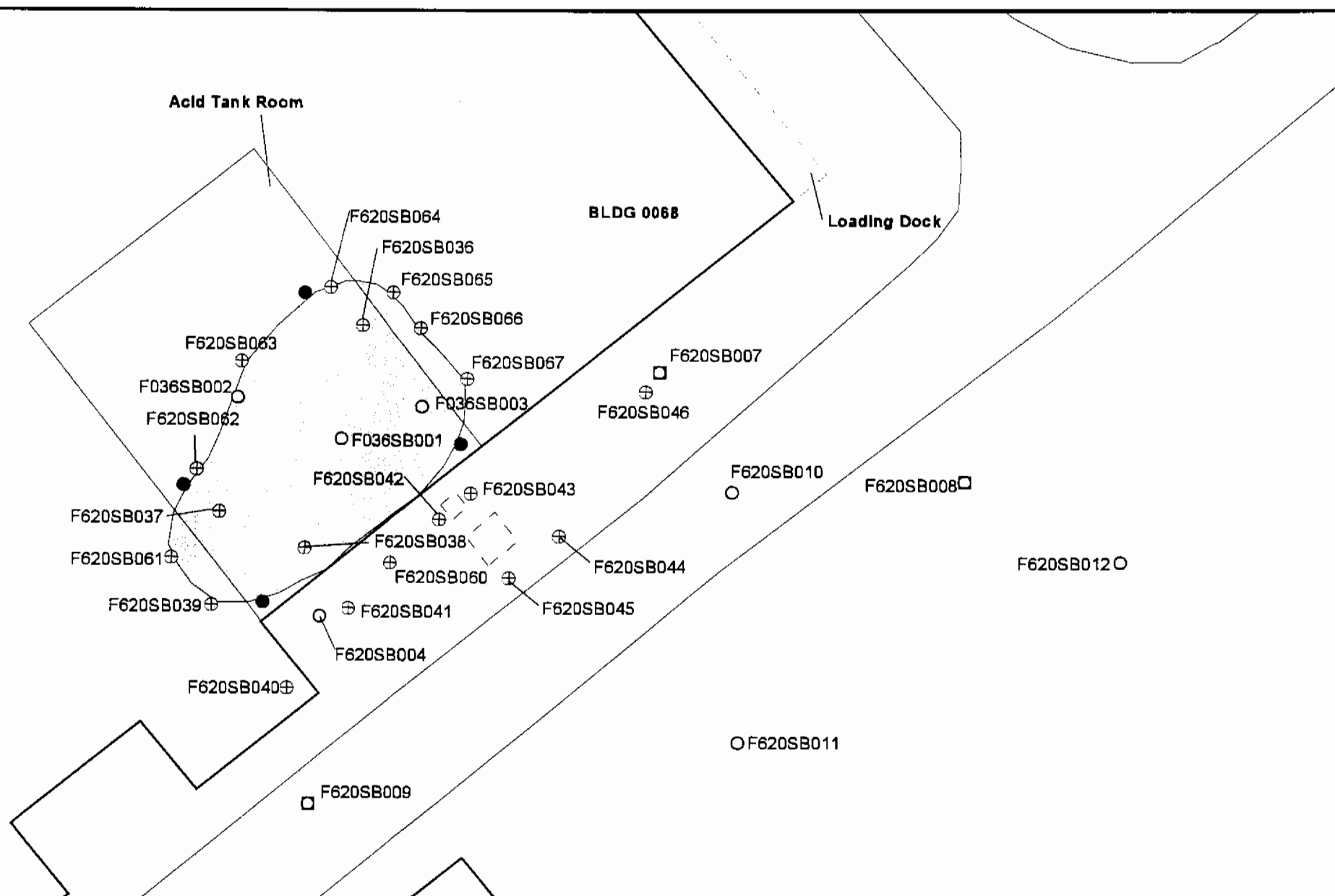


Figure 7-1
Target Soil Excavation Area in Wash Basin Area
AOC 620 RFI

Charleston Naval Complex

CH2MHILL



- Post-Demolition Confirmation Surface Soil Sample
 ○ RFI Surface Soil Sample
 □ RFI Subsurface Soil Sample
 ⊕ IM Pre-Excavation Samples
 ~ Roads
 ■ Buildings
- Excavation Area

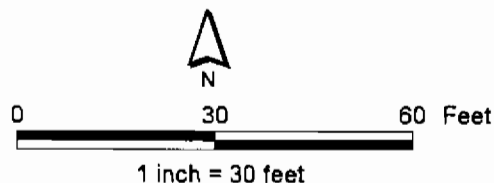
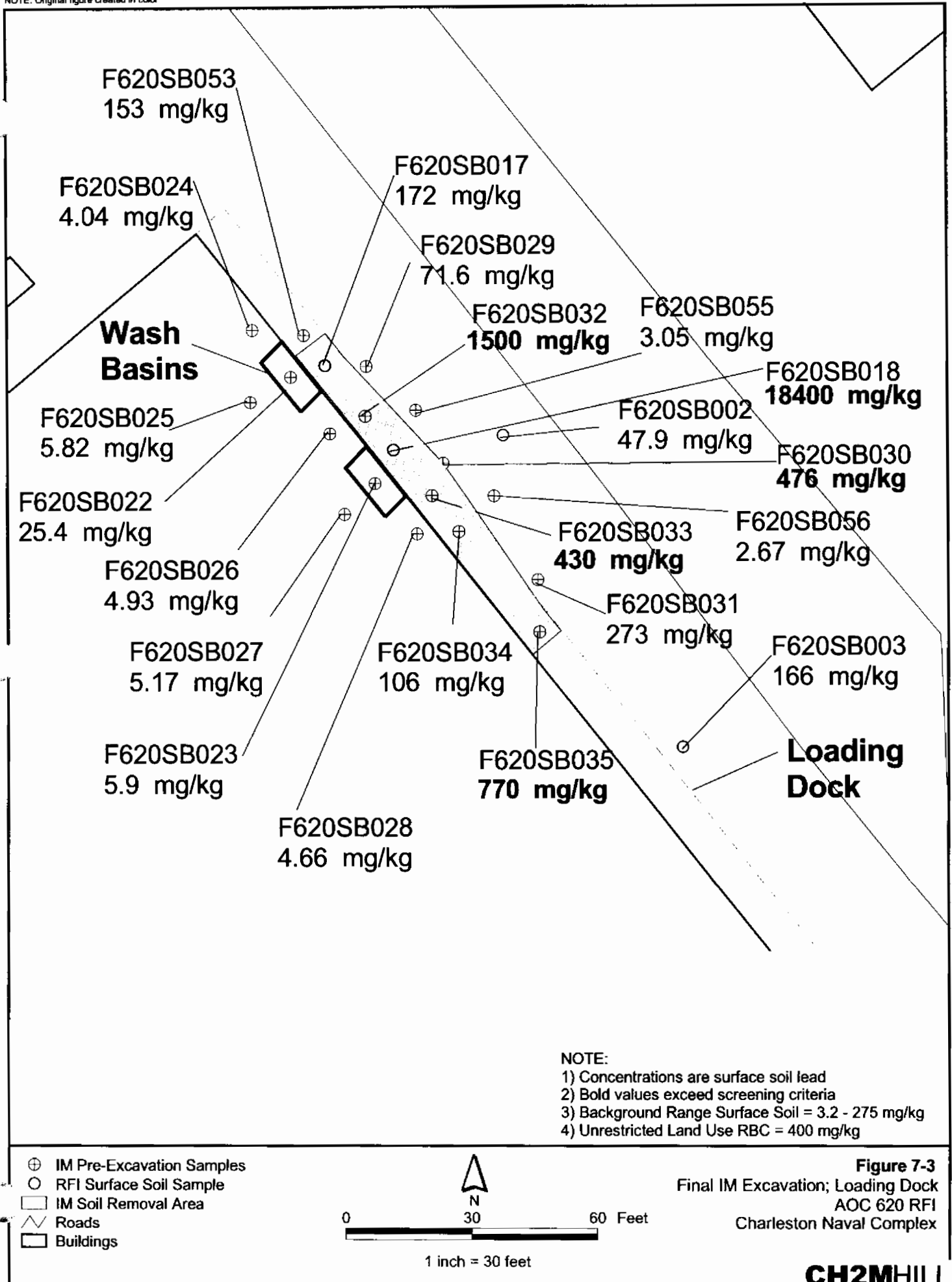
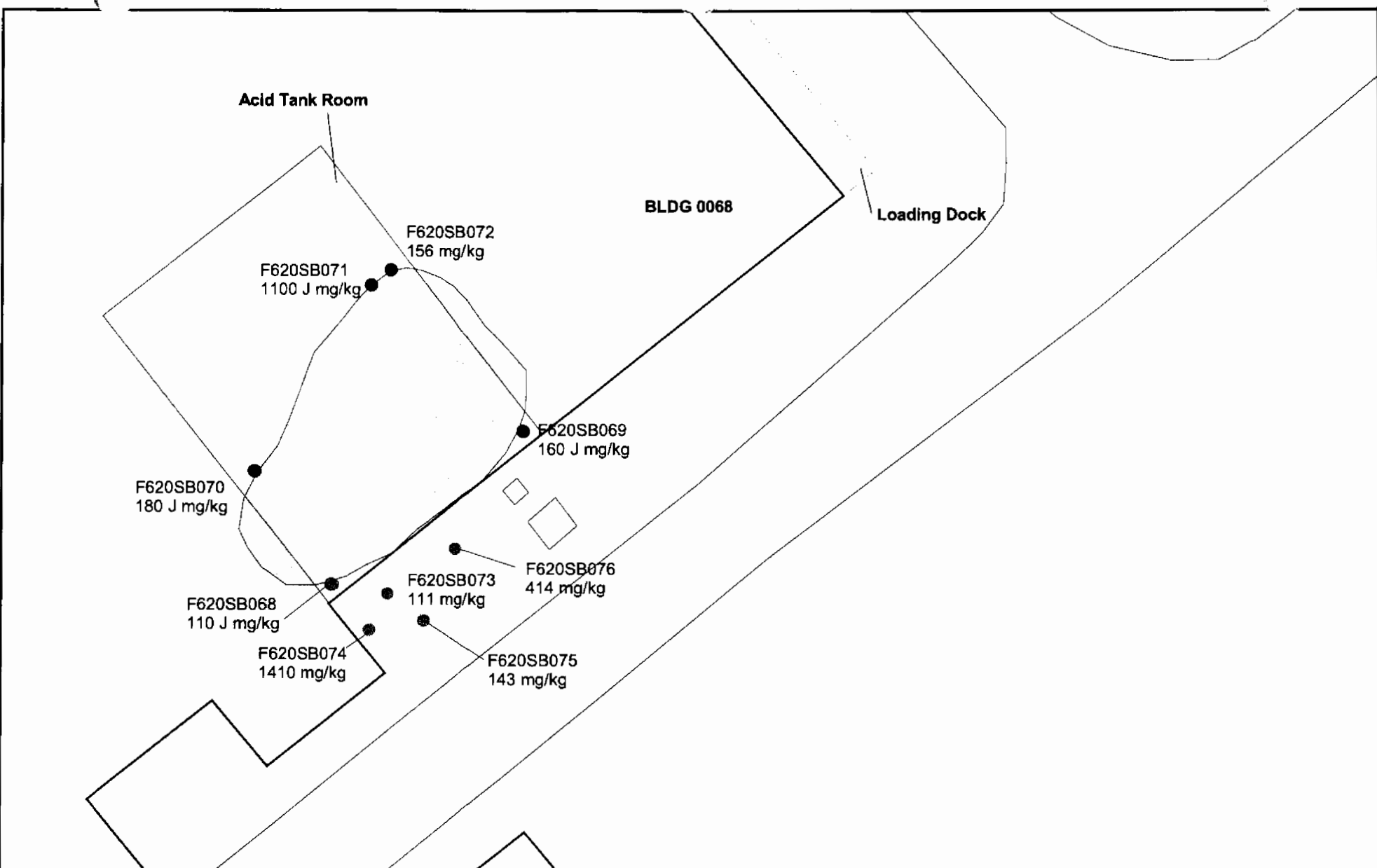


Figure 7-2
Proposed Soil Excavation in Acid Tank Area
AOC 620 RFI
Charleston Naval Complex

CH2MHILL





● Post-Demolition Confirmation Surface Soil Sample

- ∧ Roads
- Buildings
- ▨ Excavation Area

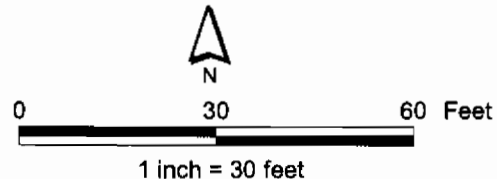


Figure 7-4
 Actual Soil Excavation in Acid Tank Area
 AOC 620 RFI
 Charleston Naval Complex

8.0 Conclusions and Recommendations

SWMU 36/AOC 620 includes former Building 68, the former Battery Shop, as well as the immediately surrounding property on all sides of the building. Building 68 was composed of 58,000 square feet (ft²) of elevated concrete floor space, supported by piles and underlain by unpaved earth. The interior space included a room with generators and transformers near the center of the building, an acid storage tank room near the south-central wall, and a wash basin area near the northeast corner. A loading dock surrounded the eastern, western, and half of the northern sides of the building.

The area surrounding Building 68 is expected to remain for industrial usage in the future. The building area is zoned for M-2 (heavy marine industrial land use).

From 1942 to 1952, Building 68 was used as a paint and oil storage facility. Beginning in 1952, it was used for the destruction, assembly, and rebuilding of large submarine batteries. Most recently, Building 68 was used for storage and charging of lead acid batteries for various equipment. In 1995 the building was decommissioned and operations ceased. In 2002, the building was demolished and all demolition material removed from the site.

Several IM activities were conducted at the site to address lead-impacted soil. Based on the results of the IM, the site is now suitable for continued industrial land use; there are no COCs in soil or groundwater under the industrial land use scenario.

Arsenic in surface soil was identified as a COC for the unrestricted land use scenario. The site is recommended for a Corrective Measure Study (CMS); a CMS Work Plan will be submitted for review.

9.0 References

- EnSafe/Allen & Hoshall. *Final Zone F RFI Work Plan*, NAVBASE Charleston. September 1996.
- EnSafe Inc. *Zone F RCRA Facility Investigation Report*, NAVBASE Charleston. December 31, 1997.
- EnSafe Inc. *Zone L RFI Report*, NAVBASE Charleston. Revision 0. 1998.
- EnSafe Inc. *Zone F RFI Report Work Plan Addendum*, NAVBASE Charleston. November 16, 1999.
- CH2M-Jones. *Zone F RFI Report Work Plan Addendum*. February 13, 2001a.
- CH2M-Jones. *Background PAHs Study Report - Technical Information for Development of Background BEQ Values*. Revision 0. February 23, 2001b.
- CH2M-Jones. *Phase I Interim Measure Work Plan; Pre-Excavation Sampling and Analysis Plan*. SWMU 36/AOC 620, Zone F. Revision 0. September 21, 2001c.
- CH2M-Jones. *Technical Memorandum: Adult Lead Methodology (ALM) Derived Target Lead Concentrations for Industrial Land Use*. November 9, 2001d.
- CH2M-Jones. *Phase II Interim Measure Work Plan; Soil Removal at Building 68*. SWMU 36/AOC 620, Zone F. Revision 0. December 26, 2001e.
- CH2M-Jones. *Phase III Interim Measure Work Plan; Additional Soil Removal in Acid Tank Room Area*. SWMU 36/AOC 620, Zone F. Revision 0. February 28, 2002a.
- CH2M-Jones. *Technical Memorandum: Phase IV Interim Measure Soil Removal*. AOC 620, Zone F. Revision 0. December 30, 2002b.
- U.S. Environmental Protection Agency. *EPA Soil Screening Guidance: Technical Background Document* (Table A-1), EPA/540/R-95/128. May 1996.
- U.S. Environmental Protection Agency. *Region III RBC Table*. October 5, 2000.

DQO Level IV. Later, three additional borings were advanced to delineate lead and PCBs detected during the first sampling round. Upper and lower interval samples were collected from the second-round soil borings. Second-round soil samples were analyzed for metals, pesticides/PCBs, and SVOAs at DQO Level III. Table 10.2.1 presents the SWMU 36 and AOC 620 soil samples and analyses.

Table 10.2.1
Zone F
SWMU 36 and AOC 620
Soil Samples and Analyses

Boring Location	Sample Identifier	Sample Interval	Date Collected	Analyses	Remarks
036SB001	036SB00101 036SB00102	Upper Lower	10/09/96	Note 1	
036SB002	036SB00201	Upper	10/08/96	Note 1	Lower interval not sampled
036SB003	036SB00301	Upper	10/09/96	Note 1	Lower interval not sampled
620SB001	620SB00101 620CB00101*	Upper	9/16/96	Note 1/ pesticides/PCBs Note 2	Lower interval not sampled *Duplicate sample
620SB002	620SB00201	Upper	8/27/96	Note 1/ pesticides/PCBs	Lower interval not sampled
620SB003	620SB00301	Upper	9/16/96	Note 1/ pesticides/PCBs	Lower interval not sampled
620SB004	620SB00401 620CB00401*	Upper	9/10/96	Note 1/ pesticides/PCBs, cyanide Note 2	Lower interval not sampled *Duplicate sample
620SB005	620SB00501 620SB00502	Upper Lower	9/16/96	Note 1/ pesticides/PCBs	
620SB006	620SB00601 620SB00602	Upper Lower	10/04/96	Note 1	
620SB007	620SB00701 620SB00702	Upper Lower	1/09/97	Note 3	Second-round sample

Table 10.2.1
Zone F
SWMU 36 and AOC 620
Soil Samples and Analyses

Boring Location	Sample Identifier	Sample Interval	Date Collected	Analyses	Remarks
620SB008	620SB00801	Upper	1/09/97	Note 3	Second-round sample
	620SB00802	Lower			
620SB009	620SB00901	Upper	1/10/97	Note 3	Second-round sample
	620SB00902	Lower			

Notes:

- 1 = SW-846 (metals, SVOAs, and VOAs) at DQO Level III
- 2 = Appendix IX suite: Appendix IX (pesticides/PCBs, herbicides, SVOAs, VOAs); SW-846 (metals, dioxins, OP-pesticides); cyanide; hex-chrome at DQO Level IV
- 3 = SW-846 (metals, pesticides/PCBs, and SVOAs) Level III
- * = Duplicate sample

10.2.3.1 Nature of Contamination in Soil

Organic compound analytical results for soil are summarized in Table 10.2.2. Inorganic analytical results for soil are summarized in Table 10.2.3. Table 10.2.4 presents a summary of all analytes detected in soil at SWMU 36 and AOC 620. Appendix D contains a complete analytical data report for all Zone F samples collected.

Volatile Organic Compounds in Soil

Five VOCs were detected in surface soil samples; one of these was also detected in subsurface soil. All VOC concentrations were far below their respective RBCs and SSLs for surface and subsurface soil.

Semivolatile Organic Compounds in Soil

Twenty SVOCs were detected in site soil samples. Nineteen SVOCs were detected in surface soil samples. Only three, benzo(a)pyrene, benzo(b)fluoranthene, and dibenz(a,h)anthracene, exceeded their RBCs in surface soil samples. Thirteen SVOCs were detected in subsurface soil samples. One SVOC — 4-methylphenol — exceeded its SSL for subsurface soil. Figure 10.2-4 presents the surface soil total BEQ exceedances detected in surface soil. Figure 10.2-5 presents the 4-Methylphenol detections in subsurface soil.

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Table 10.2.4
Zone F
SWMU 36 and AOC 620
Analytes Detected in Surface and Subsurface Soil

Parameters	Location	Surface Conc.	Residential RBC* (THQ=0.1)	Surface Background	Subsurface Conc.	Soil to Groundwater SSL* (DAF=20)	Subsurface Background
Volatile Organic Compounds (µg/kg)							
2-Butanone (MEK)	036SB001	ND	4700000	NA	10.0	7900	NA
	620SB001	3.0			NT		
	620SB002	2.0			NT		
	620SB005	ND			10.0		
4-Methyl-2-Pentanone (MIBK)	036SB003	1.0	630000	NA	NT	12300	NA
Acetone	620SB001	42	780000	NA	NT	16000 ^a	NA
Trichloroethene	620SB001	2.0	58000	NA	NT	60	NA
Xylene	036SB002	2.0	16000000	NA	NT	142000	NA
Semivolatile Organic Compounds (µg/kg)							
BEQ ¹	036SB001	660.99	88.0	NA	NA	NL	NA
	036SB002	164.54			NA		
	036SB003	357.08			NA		
	620SB001	59.703			NA		
	620SB003	261.13			NA		
	620SB004	370.93			NA		
	620SB007	120.24			NA		
	620SB008	1173.04			NA		
	620SB009	20.13			NA		
2-Methylnaphthalene	036SB001	78	310000	NA	ND	126000	NA
4-Methylphenol	036SB001	ND	39000	NA	2200	1380	NA

Table 10.2.4
 Zone F
 SWMU 36 and AOC 620
 Analytes Detected in Surface and Subsurface Soil

Parameters	Location	Surface Conc.	Residential RBC* (THQ=0.1)	Surface Background	Subsurface Conc.	Soil to Groundwater SSL* (DAF=20)	Subsurface Background
Semivolatile Organic Compounds ($\mu\text{g}/\text{kg}$)							
Acenaphthylene	620SB003	59	310000	NA	NT	293000	NA
	620SB008	140			ND		
Anthracene	036SB001	98	2300000	NA	ND	12000000 ^a	NA
	036SB003	55			NT		
	620SB003	43			NT		
	620SB008	170			53		
Benzo(a)anthracene	036SB001	360	880.0	NA	110	2000 ^b	NA
	036SB002	110			NT		
	036SB003	230			NT		
	620SB001	58			NT		
	620SB003	140			NT		
	620SB004	150			NT		
	620SB005	ND			110		
	620SB007	74			60		
	620SB008	450			80		
	620SB009	110			ND		
Benzo(a)pyrene	036SB001	400	88.0	NA	140	8000	NA
	036SB002	140			NT		
	036SB003	220			NT		
	620SB001	46.5			NT		
	620SB003	200			NT		
	620SB004	260			NT		
	620SB005	ND			100		
	620SB007	94			62		
	620SB008	760			120		

Table 10.2.4
Zone F
SWMU 36 and AOC 620
Analytes Detected in Surface and Subsurface Soil

Parameters	Location	Surface Conc.	Residential RBC* (THQ=0.1)	Surface Background	Subsurface Conc.	Soil to Groundwater SSL* (DAF=20)	Subsurface Background
Semivolatile Organic Compounds (µg/kg)							
Benzo(b)fluoranthene	036SB001	370	880	NA	120	5000 ^b	NA
	620SB001	69			NT		
	620SB003	350			NT		
	620SB004	197			NT		
	620SB005	ND			120		
	620SB007	120			69		
	620SB008	1200			160		
	620SB009	84			ND		
Benzo(g,h,i)perylene	036SB001	330	230000.0	NA	140	4.66E+08	NA
	036SB002	130			NT		
	036SB003	220			NT		
	620SB001	43			NT		
	620SB003	95			NT		
	620SB004	210			NT		
	620SB005	ND			65		
	620SB007	74			ND		
	620SB008	550			120		
Benzo(k)fluoranthene	036SB001	350	8800.0	NA	140	49000 ^b	NA
	036SB002	240			NT		
	036SB003	480			NT		
	620SB001	44.5			NT		
	620SB003	270			NT		
	620SB004	210			NT		
	620SB005	ND			91		
	620SB007	83			ND		
	620SB008	740			140		
	620SB009	63			ND		

Table 10.2.4
 Zone F
 SWMU 36 and AOC 620
 Analytes Detected in Surface and Subsurface Soil

Parameters	Location	Surface Conc.	Residential RBC* (THQ=0.1)	Surface Background	Subsurface Conc.	Soil to Groundwater SSL* (DAF=20)	Subsurface Background
Semivolatile Organic Compounds (µg/kg)							
Benzoic acid	620SB002	110	31000000	NA	NT	400000 ^{a,c}	NA
	620SB008	ND			60		
Chrysene	036SB001	490	88000.0	NA	140	160000 ^b	NA
	036SB002	140			NT		
	036SB003	280			NT		
	620SB001	58			NT		
	620SB003	230			NT		
	620SB004	130			NT		
	620SB005	ND			120		
	620SB007	110			66		
	620SB008	640			130		
	620SB009	100			ND		
Dibenz(a,h)anthracene	036SB001	160	88	NA	ND	2000 ^b	NA
	036SB003	90			NT		
	620SB004	54			NT		
	620SB008	190			ND		
Dibenzofuran	036SB003	44	31000	NA	NT	240000	NA
Fluoranthene	036SB001	720	310000.0	NA	200	4300000 ^a	NA
	036SB002	260			NT		
	036SB003	400			NT		
	620SB001	61			NT		
	620SB003	130			NT		
	620SB004	129			NT		
	620SB005	74			170		
	620SB007	120			88		
	620SB008	410			100		

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Table 10.2.4
Zone F
SWMU 36 and AOC 620
Analytes Detected in Surface and Subsurface Soil

Parameters	Location	Surface Conc.	Residential RBC* (THQ=0.1)	Surface Background	Subsurface Conc.	Soil to Groundwater SSL* (DAF=20)	Subsurface Background
Semivolatile Organic Compounds ($\mu\text{g/kg}$)							
Fluorene	036SB003	44	310000	NA	NT	560000 ^a	NA
	620SB009	52			ND		
Indeno(1,2,3-cd)pyrene	036SB001	240	880	NA	120	14000 ^b	NA
	036SB002	110			NT		
	036SB003	190			NT		
	620SB003	92			NT		
	620SB004	200			NT		
	620SB007	59			ND		
	620SB008	500			81		
Naphthalene	036SB001	72.0	310000	NA	ND	84000 ^a	NA
	036SB003	74.0			NT		
Phenanthrene	036SB001	420	230000.0	NA	77	1380000	NA
	036SB002	140			NT		
	036SB003	290			NT		
	620SB003	46			NT		
	620SB004	82			NT		
	620SB007	50			ND		
	620SB008	120			ND		
	620SB009	250			ND		

Table 10.2.4
 Zone F
 SWMU 36 and AOC 620
 Analytes Detected in Surface and Subsurface Soil

Parameters	Location	Surface Conc.	Residential RBC* (THQ = 0.1)	Surface Background	Subsurface Conc.	Soil to Groundwater SSL* (DAF = 20)	Subsurface Background
Semivolatile Organic Compounds ($\mu\text{g}/\text{kg}$)							
Pyrene	036SB001	620	230000.0	NA	220	4200000 ^a	NA
	036SB002	180			NT		
	036SB003	320			NT		
	620SB001	76			NT		
	620SB003	540			NT		
	620SB004	122.5			NT		
	620SB005	120			360		
	620SB007	110			94		
	620SB008	560			110		
bis(2-Ethylhexyl)phthalate (BEHP)	620SB007	1300	46000	NA	ND	3600000	NA
Pesticides and PCBs ($\mu\text{g}/\text{kg}$)							
4,4'-DDD	620SB001	3.2	2700	NA	NT	16000 ^b	NA
	620SB003	34.0			NT		
	620SB007	15.0			ND		
	620SB008	ND			24.0		
4,4'-DDE	620SB001	4.4	1900.0	NA	NT	54000 ^b	NA
	620SB003	47.0			NT		
	620SB004	44.5			NT		
	620SB007	140.0			ND		
	620SB008	9.1			100		
4,4'-DDT	620SB003	46.0	1900	NA	NT	32000 ^b	NA
	620SB004	120.0			NT		
	620SB007	150.0			ND		
	620SB008	6.4			75		

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Table 10.2.4
 Zone F
 SWMU 36 and AOC 620
 Analytes Detected in Surface and Subsurface Soil

Parameters	Location	Surface Conc.	Residential RBC* (THQ=0.1)	Surface Background	Subsurface Conc.	Soil to Groundwater SSL* (DAF=20)	Subsurface Background
Pesticides and PCBs (µg/kg)							
Aroclor-1254	620SB004	295	160	NA	NT	1000	NA
Aroclor-1260	620SB001	97	320	NA	NT	1000	NA
	620SB003	240			NT		
	620SB004	430			NT		
Endrin	620SB003	5.7	2300	NA	NT	1000	NA
Heptachlor	620SB003	1.7	140	NA	NT	23000	NA
alpha-Chlordane	620SB007	12.0	490	NA	ND	10000	NA
gamma-Chlordane	620SB004	6.0	490	NA	NT	10000	NA
	620SB007	24.0			ND		
	620SB008	2.6			3.6		
Dioxins (ng/kg)							
Dioxin (2,3,7,8-TCDD TEQs) ¹	620SB001	0.537	1000	NA	NA	1900	NA
	620SB004	0.8824			NA		
Herbicides (µg/kg)							
Dinoseb	620SB004	41	7800	NA	NT	NL	NA

Table 10.2.4
 Zone F
 SWMU 36 and AOC 620
 Analytes Detected in Surface and Subsurface Soil

Parameters	Location	Surface Conc.	Residential RBC* (THQ=0.1)	Surface Background	Subsurface Conc.	Soil to Groundwater SSL* (DAF=20)	Subsurface Background
Inorganics (mg/kg)							
Aluminum (Al)	036SB001	768	7800.0	18500	33000	1000000	17100
	036SB002	1060			NT		
	036SB003	34.1			NT		
	620SB001	4105			NT		
	620SB002	2340			NT		
	620SB003	3950			NT		
	620SB004	6880			NT		
	620SB005	8420			16900		
	620SB006	5200			11500		
	620SB007	5959			32300		
Antimony (Sb)	620SB008	21100	3.1	0.79	5530	5	NL
	620SB009	6430			6470		
	036SB001	1.1			ND		
	036SB002	0.53			NT		
	620SB003	2.5			NT		
	620SB004	0.725			NT		
	620SB007	2.7			1.3		
	620SB008	1.6			1.2		

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Table 10.2.4
 Zone F
 SWMU 36 and AOC 620
 Analytes Detected in Surface and Subsurface Soil

Parameters	Location	Surface Conc.	Residential RBC* (THQ=0.1)	Surface Background	Subsurface Conc.	Soil to Groundwater SSL* (DAF=20)	Subsurface Background
Inorganics (mg/kg)							
Arsenic (As)	036SB001	2.3	0.43	19.9	16.6	29 ^c	18.2
	036SB002	1.3			NT		
	620SB001	7.6			NT		
	620SB002	2.3			NT		
	620SB003	13.1			NT		
	620SB004	15.05			NT		
	620SB005	15.2			19.9		
	620SB006	8.8			9.2		
	620SB007	31.5			11.9		
	620SB008	22.6			17.4		
	620SB009	2.9			0.51		
Barium (Ba)	036SB001	62.3	550.0	61.5	31.2	1600 ^c	51.8
	036SB002	46.9			NT		
	036SB003	11.2			NT		
	620SB001	15.9			NT		
	620SB002	8.2			NT		
	620SB003	23.5			NT		
	620SB004	36.65			NT		
	620SB005	31.5			33.7		
	620SB006	16.5			28.1		
	620SB007	52.2			43.5		
	620SB008	45.6			18.1		
	620SB009	11.8			8.5		

Table 10.2.4
 Zone F
 SWMU 36 and AOC 620
 Analytes Detected in Surface and Subsurface Soil

Parameters	Location	Surface Conc.	Residential RBC* (THQ=0.1)	Surface Background	Subsurface Conc.	Soil to Groundwater SSL* (DAF=20)	Subsurface Background
Inorganics (mg/kg)							
Beryllium (Be)	036SB001	ND	0.15	1.05	1.2	63 ^c	1.20
	620SB001	0.405			NT		
	620SB002	0.21			NT		
	620SB003	0.38			NT		
	620SB004	0.5			NT		
	620SB005	0.77			1.2		
	620SB006	0.17			0.44		
	620SB007	0.33			1.3		
	620SB008	1.0			0.31		
	620SB009	0.16			0.06		
Cadmium (Cd)	036SB001	0.07	3.9	0.26	ND	8 ^c	0.09
	036SB003	0.05			NT		
	620SB001	0.305			NT		
	620SB002	0.08			NT		
	620SB003	0.69			NT		
	620SB004	0.49			NT		
	620SB007	0.50			ND		
	620SB008	0.39			0.17		
	620SB009	0.15			ND		

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Table 10.2.4
Zone F
SWMU 36 and AOC 620
Analytes Detected in Surface and Subsurface Soil

Parameters	Location	Surface Conc.	Residential RBC* (THQ=0.1)	Surface Background	Subsurface Conc.	Soil to Groundwater SSL* (DAF=20)	Subsurface Background
Inorganics (mg/kg)							
Calcium (Ca)	036SB001	261	NL	NL	9790	NL	NL
	036SB002	266			NT		
	036SB003	1650			NT		
	620SB001	126500			NT		
	620SB002	4400			NT		
	620SB003	51400			NT		
	620SB004	3480			NT		
	620SB005	8170			9330		
	620SB006	2580			3870		
	620SB007	17900			6400		
Chromium (Cr)	620SB008	7480	39 VI 7800 III	34.8	1820	38° (total)	32.2
	620SB009	2060			1170		
	036SB001	2.4			57.9		
	036SB002	2.5			NT		
	036SB003	1.4			NT		
	620SB001	10.65			NT		
	620SB002	4.6			NT		
	620SB003	20.3			NT		
	620SB004	21.3			NT		
	620SB005	18.3			33.3		
	620SB006	11.7			20.8		
	620SB007	34.1			141.0		
	620SB008	43.2			15.8		
	620SB009	8.9			8.1		

Table 10.2.4
Zone F
SWMU 36 and AOC 620
Analytes Detected in Surface and Subsurface Soil

Parameters	Location	Surface Conc.	Residential RBC* (THQ=0.1)	Surface Background	Subsurface Conc.	Soil to Groundwater SSL* (DAF=20)	Subsurface Background
Inorganics (mg/kg)							
Cobalt (Co)	036SB001	0.43	470.0	15.1	7.1	2000	6.85
	036SB002	0.46			NT		
	036SB003	1.5			NT		
	620SB001	2.35			NT		
	620SB002	0.82			NT		
	620SB003	3.2			NT		
	620SB004	2.5			NT		
	620SB005	3.4			6.5		
	620SB006	0.78			2.3		
	620SB007	2.9			7.9		
Copper (Cu)	620SB008	5.7	310.0	48.2	2.0	920	30.4
	620SB009	5.9			1.9		
	620SB001	20.8			NT		
	620SB003	53.0			NT		
	620SB004	47.3			NT		
	620SB005	19.6			27.9		
	620SB006	ND			9.3		
	620SB007	84.8			43.7		
	620SB008	43.2			17.7		
	620SB009	4.4			1.2		

Table 10.2.4
Zone F
SWMU 36 and AOC 620
Analytes Detected in Surface and Subsurface Soil

Parameters	Location	Surface Conc.	Residential RBC* (THQ=0.1)	Surface Background	Subsurface Conc.	Soil to Groundwater SSL* (DAF=20)	Subsurface Background
Inorganics (mg/kg)							
Iron (Fe)	036SB001	467	2300.0	NL	16700	NL	NL
	036SB002	976			NT		
	036SB003	197			NT		
	620SB001	6590			NT		
	620SB002	2890			NT		
	620SB003	10600			NT		
	620SB004	11185			NT		
	620SB005	16200			28200		
	620SB006	11800			16800		
	620SB007	11900			28200		
Lead(Pb)	620SB008	23900			8900		
	620SB009	4220			921		
	036SB001	1600	400.0 ^d	180	127	400 ^d	51.7
	036SB002	69.6			NT		
	036SB003	70.3			NT		
	620SB001	45.1			NT		
	620SB002	47.9			NT		
	620SB003	166			NT		
	620SB004	2660			NT		
	620SB005	78.9			58.3		
	620SB006	9.8			34		
	620SB007	287			57.3		
	620SB008	88.9			51.6		
	620SB009	61.9			5.3		

Table 10.2.4
Zone F
SWMU 36 and AOC 620
Analytes Detected in Surface and Subsurface Soil

Parameters	Location	Surface Conc.	Residential RBC* (THQ=0.1)	Surface Background	Subsurface Conc.	Soil to Groundwater SSL* (DAF=20)	Subsurface Background
Inorganics (mg/kg)							
Magnesium (Mg)	036SB001	64.5	NL	NL	2410	NL	NL
	036SB002	35.5			NT		
	036SB003	17.0			NT		
	620SB001	2005			NT		
	620SB002	247			NT		
	620SB003	1090			NT		
	620SB004	803			NT		
	620SB005	2460			4670		
	620SB006	623			1750		
Manganese (Mn)	620SB007	819	180.0	307	3550	1100	469
	620SB008	2870			719		
	620SB009	423			246		
	036SB001	5.6			95.4		
	036SB002	5.8			NT		
	036SB003	1.0			NT		
	620SB001	159			NT		
	620SB002	18.5			NT		
	620SB003	95.3			NT		
	620SB004	115.5			NT		
	620SB005	239			445		
	620SB006	22.2			77.9		
	620SB007	93.2			260		
	620SB008	277			152		
	620SB009	31.4			9.9		

Table 10.2.4
 Zone F
 SWMU 36 and AOC 620
 Analytes Detected in Surface and Subsurface Soil

Parameters	Location	Surface Conc.	Residential RBC* (THQ=0.1)	Surface Background	Subsurface Conc.	Soil to Groundwater SSL* (DAF=20)	Subsurface Background
Inorganics (mg/kg)							
Mercury (Hg)	036SB001	0.17	2.3	0.62	0.39	2°	0.23
	036SB002	0.33			NT		
	036SB003	0.11			NT		
	620SB001	0.11			NT		
	620SB003	0.11			NT		
	620SB004	0.29			NT		
	620SB005	0.56			0.32		
	620SB006	ND			0.46		
	620SB007	0.79			0.52		
	620SB008	0.27			0.18		
Nickel (Ni)	620SB009	0.09			0.17		
	036SB001	0.7	160.0	12.6	17.1	130°	8.85
	036SB002	0.77			NT		
	036SB003	0.79			NT		
	620SB001	6.85			NT		
	620SB002	1.5			NT		
	620SB003	11.3			NT		
	620SB004	7.15			NT		
	620SB005	5.9			10.9		
	620SB007	9.1			16.2		
	620SB008	14.1			5.2		
	620SB009	2.6			1.2		

Table 10.2.4
 Zone F
 SWMU 36 and AOC 620
 Analytes Detected in Surface and Subsurface Soil

Parameters	Location	Surface Conc.	Residential RBC* (THQ=0.1)	Surface Background	Subsurface Conc.	Soil to Groundwater SSL* (DAF=20)	Subsurface Background
Inorganics (mg/kg)							
Potassium (K)	036SB001	ND	NL	NL	1930	NL	NL
	620SB001	391			NT		
	620SB002	128			NT		
	620SB003	379			NT		
	620SB004	444			NT		
	620SB005	1190			2310		
	620SB006	317			793		
	620SB007	693			2170		
	620SB008	1590			442		
	620SB009	257			ND		
Selenium (Se)	620SB001	0.37	39.0	1.15	NT	5 ^c	1.24
	620SB004	0.72			NT		
	620SB005	ND			0.9		
	620SB006	0.63			1.2		
	620SB007	0.65			1.6		
	620SB008	0.91			0.47		
	620SB009	0.40			0.59		
Silver (Ag)	620SB004	0.25	39.0	1.85	NT	34 ^{a,c}	ND
	620SB007	0.33			ND		

Table 10.2.4
 Zone F
 SWMU 36 and AOC 620
 Analytes Detected in Surface and Subsurface Soil

Parameters	Location	Surface Conc.	Residential RBC* (THQ=0.1)	Surface Background	Subsurface Conc.	Soil to Groundwater SSL* (DAF=20)	Subsurface Background
Inorganics (mg/kg)							
Sodium (Na)	620SB001	255	NL	NL	NT	NL	NL
	620SB002	167			NT		
	620SB003	272			NT		
	620SB004	204.5			NT		
	620SB005	967			3470		
	620SB007	336			470		
	620SB008	391			353		
	620SB009	207			262		
Thallium (Tl)	620SB008	0.54	0.63	NL	0.64	1.24	1.24
Vanadium (V)	036SB001	2.3	55.0	48.9	82	6000 ^a	49.4
	036SB002	1.7			NT		
	036SB003	0.34			NT		
	620SB001	13.05			NT		
	620SB002	6.7			NT		
	620SB003	17.8			NT		
	620SB004	22.15			NT		
	620SB005	35.6			61		
	620SB006	13.9			29.3		
	620SB007	22.0			66.8		
	620SB008	45.3			15.5		
	620SB009	9.4			1.7		

Table 10.2.4
 Zone F
 SWMU 36 and AOC 620
 Analytes Detected in Surface and Subsurface Soil

Parameters	Location	Surface Conc.	Residential RBC* (THQ=0.1)	Surface Background	Subsurface Conc.	Soil to Groundwater SSL* (DAF=20)	Subsurface Background
Inorganics (mg/kg)							
Zinc (Zn)	036SB001	6.8	2300.0	198	192	12000 ^{b,c}	84.2
	036SB002	6.5			NT		
	036SB003	4.3			NT		
	620SB001	73.55			NT		
	620SB002	10.5			NT		
	620SB003	302			NT		
	620SB004	171			NT		
	620SB005	108			116		
	620SB006	ND			43.6		
	620SB007	214			209		
	620SB008	192			95.9		
	620SB009	19.6			3.4		

Notes:

- ^a = Calculated values correspond to a noncancer hazard quotient of 1.
- ^b = Calculated values correspond to a cancer risk level of 1 in 1,000,000.
- ^c = SSL for pH of 6.8.
- ^d = A screening level of 400 mg/kg has been set for lead based on *Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities* (USEPA, 1994a).
- ^e = Soil saturation concentration (C_{sat}).
- ^f = Residential RBCs (THQ=0.1) were used as a reference concentration for upper interval samples. Generic soil to groundwater SSLs (DAF=20) from the *Soil Screening Guidance: Technical Background Document* (USEPA, 1996c) were used as a reference concentration for lower interval samples.
- ^g = Calculated from methods described in *USEPA Interim Supplemental Guidance to RAGS: Human Health Risk Assessment, Bulletin 2* (USEPA, 1995b).
- ND = Not detected
- NT = Not taken
- NL = Not listed
- NA = Not applicable
- mg/kg = Milligrams per kilogram
- ng/kg = Nanograms per kilogram
- µg/kg = Micrograms per kilogram

Bolded concentrations exceed both the reference concentration (RBC or SSL) and the zone background.

All background values for Zone F are based on twice the means of the grid sample concentrations. One grid sample from Zone E is included in each group.

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Table 10.2.8
 Zone F
 SWMU 36 and AOC 620
 Analytes Detected in Shallow Groundwater

Note: No VOCs detected

Parameters	Location	1 st Quarter Conc.	2 nd Quarter Conc.	3 rd Quarter Conc.	Tap Water RBC* (µg/L)	MCL/SMCL* (µg/L)	Shallow Background
Semivolatile Organic Compounds (µg/L)							
4-Chloro-3-methylphenol	620003	NI	NT	1.0	NL	NL	NA
4-Methylphenol	620001	ND	2.0	ND	18	NL	NA
Acenaphthene	620003	NI	NT	2.0	220	NL	NA
Benzoic Acid	620001	2.0	1.0	5.0	15000	NL	NA
	620002	3.0	ND	5.0			
	620003	NI	NT	4.0			
	620004	NI	NT	4.0			
Diethylphthalate	620001	ND	ND	1.0	2900	NL	NA
	620002	ND	ND	2.0			
Fluorene	620001	1.0	ND	ND	150	NL	NA
Inorganics (µg/L)							
Aluminum (Al)	620001	133	69	99.5	3700	50	224
	620002	62.3	10.2	ND			
	620003	NI	ND	182			
	620004	NI	173	539			
Antimony (Sb)	620001	ND	3.3	ND	1.5	6	NL
	620002	ND	2.1	ND			
Arsenic (As)	620001	9.6	8.0	3.8	0.045	50	16.7
	620002	7.0	ND	4.9			
	620003	NI	ND	11.1			
	620004	NI	5.3	7.7			

Table 10.2.8
Zone F
SWMU 36 and AOC 620
Analytes Detected in Shallow Groundwater

Parameters	Location	1 st Quarter Conc.	2 nd Quarter Conc.	3 rd Quarter Conc.	Tap Water RBC* (µg/L)	MCL/SMCL* (µg/L)	Shallow Background
Inorganics (µg/L)							
Barium (Ba)	620001	460	525	701	260	2000	94.3
	620002	18.3	31.2	42.3			
	620003	NI	32.9	67.2			
	620004	NI	21.0	55.5			
Beryllium (Be)	620001	ND	0.28	0.85	0.016	4	0.66
	620002	ND	0.39	ND			
	620004	NI	ND	0.3			
Cadmium (Cd)	620003	NI	0.30	ND	1.8	5	0.82
	620004	NI	0.31	ND			
Calcium (Ca)	620001	128000	126000	132000	NL	NL	NL
	620002	74900	147000	152000			
	620003	NI	129000	134000			
	620004	NI	74000	117000			
Chromium (Cr)	620001	2.2	4.9	7.2	18	100	2.05
	620002	ND	ND	1.2			
	620003	NI	ND	1.4			
	620004	NI	ND	3.7			
Cobalt (Co)	620001	ND	1.3	1.6	220	NL	10.9
	620004	NI	1.5	2.4			
Copper (Cu)	620001	ND	2.0	ND	150	1000	NL
	620003	NI	2.5	ND			

Table 10.2.8
 Zone F
 SWMU 36 and AOC 620
 Analytes Detected in Shallow Groundwater

Parameters	Location	1 st Quarter Conc.	2 nd Quarter Conc.	3 rd Quarter Conc.	Tap Water RBC* (µg/L)	MCL/SMCL* (µg/L)	Shallow Background
Inorganics (µg/L)							
Iron (Fe)	620001	6440	15000	8780	1100	300	NL
	620002	1850	134	2830			
	620003	NI	6880	11700			
	620004	NI	1920	15300			
Lead (Pb)	620001	4.6	ND	ND	15	15	NL
	620004	NI	30.7	ND			
Magnesium (Mg)	620001	359000	423000	388000	NL	NL	NL
	620002	6200	6450	7910			
	620003	NI	231000	18800			
	620004	NI	17400	338000			
Manganese (Mn)	620001	286	214	193	84	50	2010
	620002	208	157	208			
	620003	NI	749	604			
	620004	NI	613	477			
Nickel (Ni)	620001	ND	3.8	3.4	73	100	5.55
	620002	ND	ND	1.4			
	620004	NI	3.7	ND			
Potassium (K)	620001	169000	137000	162000	NL	NL	NL
	620002	7070	14200	14400			
	620003	NI	16800	19200			
	620004	NI	13000	140000			
Selenium (Se)	620002	ND	3.7	ND	18	50	NL
Silver (Ag)	620004	NI	ND	1.5	18	100	NL

Table 10.2.8
Zone F
SWMU 36 and AOC 620
Analytes Detected in Shallow Groundwater

Parameters	Location	1 st Quarter Conc.	2 nd Quarter Conc.	3 rd Quarter Conc.	Tap Water RBC* (µg/L)	MCL/SMCL* (µg/L)	Shallow Background
Inorganics (µg/L)							
Sodium (Na)	620001	3460000	3550000	4630000	NL	NL	NL
	620002	40900	31100	25500			
	620003	NI	75900	71400			
	620004	NI	169000	3400000			
Thallium (Tl)	620001	11.0	ND	ND	0.29	2	5.58
	620002	2.8	ND	ND			
	620003	NI	5.2	ND			
Vanadium (V)	620001	13.9	7.1	8.2	26	NL	1.58
	620002	1.1	ND	ND			
	620004	NI	2.6	9.2			
Zinc (Zn)	620001	ND	ND	13.4	1100	5000	NL
pH							
pH	620003	NI	7.02	NT	NL	NL	NL
	620004	NI	6.95	NT			

Notes:

- NL = Not listed
- NA = Not applicable
- NI = Not installed until April/May
- NT = Not taken
- µg/L = Micrograms per liter
- * = Tap water RBCs (THQ=0.1) from *Risk-Based Concentration Table, January-June 1996* (USEPA, 1996b). MCLs/SMCLs from *Drinking Water Regulations and Health Advisories* (USEPA, 1996e) were used as reference concentrations.

Bolded concentrations exceed both the RBC and the zone background.

All background values for Zone F are based on twice the means of the grid sample concentrations. One grid sample from Zone E is included in each group. Background values for groundwater are based on two sampling rounds in two wells at each depth.

Wells 62003 and 62004 were installed during the second-round and are included in calculations for this table

Data presented are from the initial sampling event only

Detected Parameters from Zone L Samples in AOC 620 Geographic Area
SWMU 36/AOC 620 RFI Report Addendum

Parameter	Location	Concentration	Qualifier	Units	SSL ^a	Subsurface Background Concentration ^b
Aluminum	LF037SP030	8240 =		mg/kg	NL	2630 - 36,800
	LF699SP001	4380 =		mg/kg		
	LF699SP002	2330 =		mg/kg		
	LG037SP002	8590 =		mg/kg		
Antimony	LF699SP001	2.67 =		mg/kg	2.5	NA
	LF699SP002	4.28 =		mg/kg		
Arsenic	LF037SP030	14.2 =		mg/kg	15	1.4 - 36
	LF699SP001	14.4 =		mg/kg		
	LF699SP002	4.17 =		mg/kg		
	LG037SP002	8.34 =		mg/kg		
Barium	LF037SP030	618 =		mg/kg	800	7.7 - 63
	LF699SP001	42.9 =		mg/kg		
	LF699SP002	46.4 =		mg/kg		
	LG037SP002	24.0 =		mg/kg		
Beryllium	LF037SP030	0.475 =		mg/kg	32	0.22 - 2.4
	LF699SP001	0.267 =		mg/kg		
	LG037SP002	0.545 =		mg/kg		
Cadmium	LF037SP030	0.677 =		mg/kg	4	0.08 - 0.52
	LF699SP002	2.20 =		mg/kg		
	LG037SP002	0.579 =		mg/kg		
Calcium	LF037SP030	61900 =		mg/kg	NL	1040 - 127,000
	LF699SP001	6180 =		mg/kg		
	LF699SP002	1660 =		mg/kg		
	LG037SP002	42200 =		mg/kg		
Chromium, Total	LF037SP030	20.8 =		mg/kg	19	7.4 - 65
	LF699SP001	81.4 =		mg/kg		
	LF699SP002	67.6 =		mg/kg		
	LG037SP002	25.5 =		mg/kg		
Cobalt	LF037SP030	3.80 =		mg/kg	130000	0.9 - 15
	LF699SP001	1.56 =		mg/kg		
	LF699SP002	1.32 =		mg/kg		
	LG037SP002	3.48 =		mg/kg		
Copper	LF037SP030	30.6 =		mg/kg	5300	2.5 - 55
	LF699SP001	58.1 =		mg/kg		
	LF699SP002	116 =		mg/kg		
	LG037SP002	34.3 =		mg/kg		
Cyanide	LF037SP030	0.309 =		mg/kg	20	NA
	LF699SP002	0.329 =		mg/kg		

Detected Parameters from Zone L Samples in AOC 620 Geographic Area
SWMU 36/AOC 620 RFI Report Addendum

Parameter	Location	Concentration	Qualifier	Units	SSL ^a	Subsurface Background Concentration ^b
Iron	LF037SP030	15600 =		mg/kg	NL	3110 - 58,100
	LF699SP001	8220 =		mg/kg		
	LF699SP002	5250 =		mg/kg		
	LG037SP002	11000 =		mg/kg		
Lead	LF037SP030	140 =		mg/kg	400 *	2.4 - 123
	LF699SP001	153 =		mg/kg		
	LF699SP002	167 =		mg/kg		
	LG037SP002	85.5 =		mg/kg		
Magnesium	LF037SP030	2110 =		mg/kg	NL	399 - 7040
	LF699SP001	467 =		mg/kg		
	LF699SP002	218 =		mg/kg		
	LG037SP002	2070 =		mg/kg		
Manganese	LF037SP030	178 =		mg/kg	480	20 - 1120
	LF699SP001	46.3 =		mg/kg		
	LF699SP002	38.7 =		mg/kg		
	LG037SP002	169 =		mg/kg		
Mercury	LF037SP030	0.641 =		mg/kg	1	0.04 - 0.57
	LF699SP001	0.856 =		mg/kg		
	LF699SP002	0.296 =		mg/kg		
	LG037SP002	0.0788 =		mg/kg		
Nickel	LF037SP030	8.19 =		mg/kg	65	1.9 - 22
	LF699SP001	4.67 =		mg/kg		
	LF699SP002	5.71 =		mg/kg		
	LG037SP002	10.7 =		mg/kg		
Potassium	LF037SP030	663 =		mg/kg	NL	195 - 3790
	LF699SP001	418 =		mg/kg		
	LF699SP002	96.9 =		mg/kg		
	LG037SP002	707 =		mg/kg		
Selenium	LF037SP030	0.665 =		mg/kg	2.5	0.4 - 1.7
	LF699SP001	0.633 =		mg/kg		
	LF699SP002	0.582 =		mg/kg		
	LG037SP002	0.591 =		mg/kg		
Sodium	LF037SP030	319 =		mg/kg	NL	289 - 3890
	LF699SP001	221 =		mg/kg		
	LF699SP002	137 =		mg/kg		
	LG037SP002	233 =		mg/kg		
Tin (Sn)	LF699SP001	4.44 =		mg/kg	NL	1.1 - 2.9
	LF699SP002	10.1 =		mg/kg		
Vanadium	LF037SP030	24.1 =		mg/kg	3000	5.9 - 112

Detected Parameters from Zone L Samples in AOC 620 Geographic Area
SWMU 36/AOC 620 RFI Report Addendum

Parameter	Location	Concentration	Qualifier	Units	SSL ^a	Subsurface Background Concentration ^b
	LF699SP001	17.0 =		mg/kg		
	LF699SP002	6.48 =		mg/kg		
	LG037SP002	24.0 =		mg/kg		
Zinc	LF037SP030	400 =		mg/kg	6000	9.3 - 198
	LF699SP001	133 =		mg/kg		
	LF699SP002	574 =		mg/kg		
	LG037SP002	148 =		mg/kg		

Concentrations highlighted in bold type exceed screening criteria

^a Values extrapolated from EPA Soil Screening Guidance: User's Guide; DAF = 10

^b Background Range values are the minimum and maximum concs. detected in Zones E and F

* Default Soil Screening Level (SSL) for lead = 400 mg/kg

NA = Data not available

NL = Not listed

SCDHEC Comments Prepared by Eric Cathcart (February 26, 1999)

Comment 1:

Soil sample blanks for the following areas contained detectable contaminants: SWMU 4, AOC 619, SWMU 36, AOC 620, SWMU 109, AOC 607, AOC 609, AOC 611, AOC 613, AOC 616, AOC 617, and Grid soil samples. Groundwater blanks contained detectable contaminants for the following areas: AOC 619, AOC 620, SWMU 109, AOC 607, AOC 609, AOC 613, GEL samples, Location 240, AOC 617, and Grid groundwater samples. These detections were noted in the volatile, semivolatile, and metals methods. In accordance with the Environmental Protection Agency, Standard Operating Procedures for sample collection, trace contaminants in field, trip, equipment, and distilled water blanks may indicate a problem with either decontamination procedures and/or cross contamination of samples during collection or transport. The RFI report should fully explain the existence of trace contaminants in blanks. Please revise the text to include this/these explanation(s).

Navy/EnSafe Response 1:

The Project Chemist has reviewed and evaluated the data and compiled the findings in the following memo to the Project Team for review and approval.

Memorandum

To: Charleston Naval Complex Project Team

From: Charlie Vernoy, EnSafe

Subject: **Response to Comments on the Draft Zone F and K RFI Reports**

Date: March 31, 1999

Several comments by the South Carolina Department of Health and Environmental Control (SCDHEC) on the Draft Zone F and K RFI Report discuss the context of the Data Validation section and how blank contamination can be further explained relevantly to specific site samples. This memo is intended to explain the data validation process and how it relates to blank contamination associated with the RFI report process for the Charleston Naval Complex (CNC) project and offer a resolution to stated comments. For demonstration purposes, AOC 607 in Zone F has been designated as the site to be addressed in this memo.

As part of the RFI process at CNC, chemical environmental samples undergo a third party data validation review process following USEPA Functional Guidelines. This process includes the review of analytical data generated at specific data quality objectives (DQOs) and making a determination of the validity of the results through implementation of the functional guidelines and providing professional judgement in the qualification of the data. DQOs include the collection and analysis of quality control (QC) blanks which are intended to identify possible contaminants that may be associated with the collection/analysis process.

To assess possible cross contamination from sampling procedures, deionized water, equipment, and field blanks are collected on a weekly basis per sampling event and trip blanks are submitted daily when volatile organic compounds (VOCs) are requested for analysis. The laboratory is also required to provide data on internal laboratory contamination and must analyze method blanks according to specific method requirements. The QC blanks and environmental samples are analyzed by the same methods and are routinely batched in the same Sample Delivery Group (SDG). A typical SDG includes a total of 20 samples. Batching QC and environmental samples together in the same SDG provides needed information to the data validator to make necessary decisions about the quality of the data. There are occasions when a sampling event at a particular site will have multiple SDGs and it becomes the responsibility of the data validator to incorporate the findings of QC blanks into other SDGs associated with the site.

Each SDG has its own data package incorporating the analytical results of samples and providing necessary QC data to make judgements about the validity of the data. When reviewing the data, the validator follows strict guidelines and must qualify sample data when appropriate. Contamination found in QC blank data is one aspect where qualification of data is necessary. Functional guidelines state that when contamination is found in QC blanks the validator must incorporate the findings to site samples where applicable. The way the validator applies the finding is through the "5x" or "10x" rule. The "5x" rule is taking the analytical result of the contaminant found in a QC blank and multiplying the result by five. If a compound is found in all associated blanks, then the highest result is subjected to the rule. The adjusted result is then compared to all site samples and if detections in site samples are less than the adjusted result of the blank contaminant, site sample detections are adjusted to non-detect. This rule covers all compounds except for acetone, methylene chloride, 2-butanone, and bis(2-ethylhexyl)phthalate, which are known laboratory and possible field sampling contaminants, where the "10x" rule will apply.

Upon completion of the data review process, the validator generates a validation report which includes the functional guideline checklist with instructions on qualifying data, actual data sheets of site samples showing data qualifiers, an electronic file of the site sample data with qualifiers, and a summary report outlining deficiencies noted and data qualifiers used. EnSafe reviews the report for consistency and electronically adds the data files to a database. Once the data is validated and added to the database it becomes final and is used in writing nature and extent, fate and transport, and risk assessment sections for RFI reports. As part of the Data Validation section in the CNC RFI reports, all SDG data validation summary reports and database spreadsheets are included for review.

As part of the RFI report process, all contaminants detected in site samples that are not validated to non-detect are to be mentioned in the nature and extent section and compared to regulatory limits such as risk-based concentrations, soil screening and maximum contaminant levels. In short, if an adjusted blank contaminant detection was not higher than the site sample detection, then the site sample result is reported in the RFI report. This result would then be reviewed as a possible chemical of potential concern (COPC) or chemical of concern (COC) and identified as such where applicable. The quarterly monitoring sampling program would help to determine if a COPC or COC was from cross contamination or

actual detection.

Section 4.3 in the Zone F and K Draft RFI reports summarized blank contamination found in common multiple blanks associated with a particular site (usually first round sampling events). The sections did not list contaminations found in only one blank because of the assumption that it was a single occurrence and not part of a trend. The data validation summary reports listed all blank contamination per SDG but do not point out trends between the SDGs.

In addressing comments concerning blank contamination at CNC, AOC 607 was used to demonstrate the association between field and method blank detections in all sampling events under the RFI in Zone F. Tables 1 and 2 list compounds detected and the ranges associated with the blanks. The asterisk denotes compounds that were detected in a blank but were not detected in a site sample.

Table 1 - Soil AOC 607

<i>Field Blanks</i>	<i>Range</i>	<i>Method Blanks</i>	<i>Range</i>
1234678-HxCDF	3.76-11.7 pg/L	1234678-HpCDD	3.67 pg/L
123478-HxCDF	0.704-2.29 pg/L	234678-HxCDF	3.15 pg/L
123678-HxCDD	2.74-7.37 pg/L	Acetone	2-12 ug/L
123678-HxCDF	1.3 pg/L	Aluminum	2.27 ug/L
123789-HxCDD	50.2-131 pg/L	Beryllium	.035-.039 ug/L
234678-HxCDF	2.74-3.5 pg/L	bis(2-Ethylhexyl)phthalate	45-53 ug/L
2-Butanone	23 ug/L	Butylbenzylphthalate	94 ug/L
Acetone	4-120 ug/L	Chloroform	1 ug/L
Acetonitrile	2800-14000 ug/L	Chromium*	.155-.202 ug/L
Aluminum	246 ug/L	Iron	4.9-6.27 ug/L
Barium	16.7 ug/L	Lead	0.296 ug/L
Benzyl Alcohol*	2 ug/L	Methylene Chloride	2-14 ug/L
Beryllium	0.31-.41 ug/L	OCDD	31 pg/L
Bromodichloromethane*	13 ug/L	Thallium	.425-4.76 ug/L
Calcium	18.7 ug/L	Tin	1.37-2.8 ug/L
Chloroform*	34 ug/L	Vanadium	0.052-.852 ug/L
Chromium	1 ug/L		
Copper	0.75 ug/L		
Cyanide	3.5 ug/L		
Iron	596 ug/L		
Magnesium	1340 ug/L		
Manganese	13.3 ug/L		
Mercury	0.11 ug/L		
Methylene Chloride	1-14 ug/L		
Napthalene	1 ug/L		
Nickel	14 ug/L		
N-	1-4 ug/L		

Nitrosodimethylamine*	
OCDD	388-744 pg/L
OCDF	2.5-6.71 pg/L
Potassium	1320 ug/L
Sodium	6410 ug/L
Thallium	6.8 ug/L
Tin	2.8 ug/L
Toluene	2 ug/L
Vanadium	1.7 ug/L
Zinc	7.1-10.3 ug/L

Notes:

* Compounds not detected in any site samples.

Table 2 - Water AOC 607

<i>Field Blanks</i>	<i>Ranges</i>	<i>Method Blanks</i>	<i>Ranges</i>
1234678-HpCDD*	3-6 pg/L	1234789-HpCDF*	3.76 pg/L
234678-HxCDF*	3 pg/L	234678-HxCDF*	6.45 pg/L
Acetone	3 ug/L	Acetone	3-7 ug/L
Aluminum	9.3-19.6 ug/L	Aluminum	12-23.8 ug/L
Antimony	1.7-2.8 ug/L	Antimony	1.6-6.22 ug/L
Arsenic	2.2-2.5 ug/L	Arsenic	2.53-2.67 ug/L
Barium	.34-.98 ug/L	Barium	.35-2.55 ug/L
BEHP*	1-110 ug/L	BEHP*	1-10 ug/L
Bromodichloromethane	2 ug/L	Benzene*	1 ug/L
*			
Calcium	39.2-99.8 ug/L	Benzoic acid	4 ug/L
Chloroform*	1-7 ug/L	Calcium	60.5 ug/L
Chromium	1.5 ug/L	Chloroform*	1-3 ug/L
Cobalt	1.1 ug/L	Cobalt	1.24 ug/L
Di-n-octyl phthalate*	9 ug/L	Copper	1.14-2.5 ug/L
Iron	22.4-35.9 ug/L	Cyanide*	1.79-2.5 ug/L
Magnesium	49.8 ug/L	Diethylphthalate*	1 ug/L
Manganese	.38-.72 ug/L	Heptachlor*	0.012 ug/L
Methylene Chloride	6-19 ug/L	Iron	20.1-32 ug/L
Nickel	1.8 ug/L	Lead	.91-1.4 ug/L
OCDD*	9 pg/L	Magnesium	50.6-56.9 ug/L
OCDF*	4 pg/L	Manganese	.5-1.2 ug/L
Potassium	690-699 ug/L	Methylene Chloride	2-17 ug/L
Silver	2.3-3.8 ug/L	Nickel	.72-1 ug/L
Sodium	33.2-24700 ug/L	OCDD*	7.35-11 pg/L
Tetrachloroethene	1-14 ug/L	OCDF*	5.66 pg/L
Zinc	7.6 ug/L	Potassium	178 ug/L

Silver	1.44-1.94 ug/L
Sodium	27.5-107 ug/L
Tetrachloroethene	2 ug/L
Thallium	3.4-3.75 ug/L
Tin	19.6 ug/L
Toluene	2 ug/L
Vanadium	0.813 ug/L
Xylene*	1-2 ug/L
Zinc	7.61-10.2 ug/L

Notes:

- * Compounds not detected in any site samples.

In reviewing the compounds for both lists, explanations can be made as to why certain compounds were detected. The majority of compounds that make the lists are inorganics. In comparing the method blank lists there was an increase of inorganic compounds detected in the water events as compared to the soil events. Detections generally ranged higher for the water event method blanks. The field blank lists showed virtually the same number of inorganic compounds for both soil and water events. In contrast to the method blanks, detections of common metals in the field blanks generally ranged higher for soil events. A possible reason for the high incident of metals in field blanks maybe the water from the North Charleston Water System which is used for the on-site carbon filtered/single canister deionized water system. The deionized system is routinely maintained by the Culligan company, but even working at optimal efficiency the system cannot filter out all compounds. The same can be said of the laboratories that use a carbon filtered/dual canister deionized system to filter water for the method blanks. Eliminating all metal detections from blank analyses is an insurmountable task and efforts to identify exact sources of metals are impossible.

The organic blank detections are easier to explain in some cases. For example, the VOCs bromodichloromethane and chloroform were detected in field blanks for the soil and water events and but just chloroform was detected in the method blanks. The two VOCs are common by-products of the chlorination process of municipal water systems. As noted in the tables, bromodichloromethane and chloroform were not detected in any site samples during water sampling events.

The chlorinated dioxin and dibenzofuran detections noted in the field and method blanks are common contaminants found in a dioxin lab. Due to the extremely low detection limits (parts per quadrillion) that a dioxin lab routinely meets due to current technology, it has become extremely difficult to decontaminate glassware down to non-detect levels. However, once the 2,3,7,8-TCDD Toxicity Equivalency Factors (TEFs) are applied to the results, the overall detections are minimal.

It is possible for acetone to be detected in samples because of the decontamination procedures at CNC that use isopropyl alcohol. Acetone being a contaminant of isopropyl alcohol. But the decontamination procedures used in the field are not what laboratories

follow so the acetone detections in the method blanks must be from cross contamination in the lab. Acetone is used in laboratories as a solvent for the extraction of soils.

Methylene chloride is not used in decontamination procedures but was detected in field blanks as well as in method blanks. The explanation for this is that laboratories use methylene chloride when performing water extraction for semivolatile and pesticides analyses and very likely cross contamination with CNC samples has occurred. Methylene chloride has not been identified as a COC at AOC 607.

Tetrachloroethene (PCE), also not used in decontamination procedures, was detected in the field and method blanks for the water events. AOC 607 has large PCE detections in the shallow and intermediate groundwater around building 1189 and it is very possible that cross contamination between samples as occurred. The detections for PCE do not affect the results found in the site samples.

The detections of benzene, toluene, and xylene are all below their respective method detection limits (MDLs) and cannot be verified as a true detection. The high detections of acetonitrile (an Appendix IX compound) occurred in two field blanks collected in 11/96. Both blanks were from the same SDG and no associated site samples had detections of the compound.

The phthalate compounds detected in both field and method blanks are commonly found in plastics found in disposable gloves and glassware. The phthalates that were detected in blanks during water events were not detected in any site samples. Phthalates were detected in the method blanks during soil events and not the field blanks leading to the speculation that phthalate contamination is caused by the laboratory.

CH2M-Jones Response Clarification:

See document "Response to Reply to Comment Responses."

SCDHEC Comment 3:

AOC 620/SWMU 36

The report states that groundwater discharged to the Cooper River "would experience significant dilution, attenuating concentrations even further". This statement assumes a single contaminant source that has been identified and contained. The report; however, does not account for the enrichment of surface and/or groundwater contamination from a downgradient or upgradient source. The area downgradient of SWMU 36/AOC 620 has been investigated for lead contamination in the subsurface and is known to have elevated levels. Also, the location upgradient of this area has been identified as exhibiting elevated levels of lead. This is important information and should be included in the RFI Report. If the Navy is interested in pursuing natural dilution as an option for remediation, then the Department suggests the production of a comprehensive fate and transport model.

Navy/EnSafe Response 3:

The Navy will re-examine the lead distribution in soil and groundwater to include a greater

area. The lead issue will be evaluated with this data.

CH2M-Jones Response Clarification:

The RFI Report Addendum concludes that lead is not present in AOC 620 groundwater at elevated concentrations, and that the groundwater at this site does not require remediation.

SCDHEC Comments on the
Zone F Draft RCRA Facility Investigation Report
Charleston Naval Complex
Dated December 31, 1998
(Clarifications inserted October 14, 2002)

SCDHEC Comments Prepared by Johnny Tapia (March 12, 1999)

Comment 1:

The RCRA Facility Assessment (RFA) lists AOC 621 as being located in Zone F, however this unit has been included as part of figure 1-2, table 1.1 or this RFI report. If no investigation has been performed at this unit, work should be proposed in accordance with the current RCRA permit. Please clarify.

Navy/EnSafe Response 1:

This site is actually in Zone E. The AOC has undergone interim measures to abate the problem. AOC 621 will be included in the Final Zone E RFI Report.

CH2M-Jones Response Clarification:

AOC 621 is included in the RFI Report Addendum for SWMU 5/SWMU 18/AOC 605/SWMU 621, Zone E.

Comment 2:

Section 4.3. "Data Validation Reports" is an enumeration of the results and detections of blank samples in soil and groundwater. These results should be interpreted in a relevant and meaningful manner by describing if the blank detection means the contaminant is present in the sample, is a product of cross-contamination, etc. This would clarify the significance of the presence of certain contaminants in the samples collected at each unit. As written, contributes minimum value for the review of the document. Please revise this section.

Navy/EnSafe Response 2:

The Project Chemist will review and evaluate the data and compile the findings into a memo for the Project Team's review and approval. Please see response to E. Cathcart Comment #1.

CH2M-Jones Response Clarification:

No further clarification needed.

Comment 3:

Table 6.4 which calculates the Soil Screening Levels for the protection of groundwater needs to revise and recalculate the values for Thallium and Benzo(a)pyrene. The MCL values for the Target Leachate Concentration are not correct, therefore the calculated SSL values need to be verified. Please correct and consider implications throughout the report.

Navy/EnSafe Response 3:

The MCL value for benzo(a)pyrene in Table 6.4, used as the unadjusted target leachate concentration, is shown incorrectly as 0.002 mg/L; it should be 0.0002 mg/L, and will be corrected in the final report. The unadjusted target leachate concentration of 0.0005 mg/L shown for thallium is actually the MCLG rather than thallium's MCL of 0.002 (see column heading in table), and is therefore more conservative (lower) than the MCL. The *Soil Screening Guidance: User's Guide* specifies the use of a nonzero MCLG, MCL, or HBL (Equation 10, p. 29) to determine the target soil leachate concentration. In any event, neither of the calculated SSLs from Table 6.4 was used in the Section 10 screening tables. Because benzo(a)pyrene has an EPA-calculated SSL of 8 mg/kg (*Soil Screening Guidance:*

Technical Background Document, Appendix A), that value was used in the tables. The EPA-calculated value of 0.7 mg/kg for thallium would have been used in the screening tables, except that thallium's background reference value of 1.24 mg/kg for subsurface soil was higher, and was therefore used instead. Sometime after the draft RFI report for Zone F was submitted, SCDHEC requested that background reference values for inorganics not be used in place of corresponding SSLs in the fate and transport screening tables when they exceed the SSLs. Consequently, 0.7 mg/kg will be used as the SSL for thallium in the final RFI report.

CH2M-Jones Response Clarification:

SSLs for both thallium and benzo[a]pyrene are taken from the Soil Screening Guidance Technical Background Document, adjusted for DAF=10. CH2M-Jones does not agree that background values that exceed SSL values should not be considered in the assessment of COCs. Therefore, if background data indicate that background values exceed the SSL, these background data will also be used as screening levels in assessing whether a chemical may be a COC.

Comment 4:

The second paragraph of page 6.16 needs to be revised for the statements made about the use of the highest of background values (upper or lower soil) used as the screening alternative to SSLs. The same approach is mentioned for groundwater where the greater of shallow or deep background concentrations is used as an screening alternative to the tap water RBCs. Using this approach defeats the purpose of collecting two set of samples (upper and lower) to determine background reference concentrations and is not a conservative screening process. In addition, the same paragraph states that this approach is proposed based only on assumptions. The Screening process should continue as previously approved. Please revise this paragraph and consider implications throughout the report.

Navy/EnSafe Response 4:

Contaminant transport from soil to groundwater involves infiltration of rainwater into the soil followed by percolation downward through surface soil and subsurface soil (the vadose, or unsaturated zone), through the water table into the saturated zone (the unconfined aquifer). Each molecule of water is exposed to contaminants in both surface and subsurface soil as it moves downward to the aquifer. Because the migrating soil water is also exposed to background concentrations of soil constituents at each level, the only relevant background concentration for making comparisons to contaminant concentrations is the greater of the surface soil or subsurface soil values. Collecting background soil samples at both depths is necessary because most human health risk assessment applications require comparisons to background for surface soil only. Because of SCDHEC's request (see Response 3 above) that background values not be used in place of SSLs, however, this is a moot point.

As stated in the paragraph in question on page 6.16, the lithology of the surficial aquifer in Zone F is complex. Given the uncertainty about the interconnectedness of the portions of the aquifer encountered in each well, groundwater results from each depth (shallow or deep) will be screened only against background reference values from the corresponding depth for the final report.

CH2M-Jones Response Clarification:

See document "Response to Reply to Comment Responses" for the revised EnSafe response.

Comment 5:

Please clarify in the text that according to EPA's latest guidance on dioxins the 1,000 ng/Kg (as 2,3,7,8-TCDD TEQs) is based on a residential cleanup level with a risk level of 1E-4. Please clarify also that this cleanup level is being used as a screening number due to the complex and time-consuming calculations involved with risk presented by dioxins. For instance page 7.7 needs this clarification. Please correct accordingly.

Navy/EnSafe Response 5:

The above clarifications will be made in the revised report with one exception. The 1,000 ng/kg PRG for 2,3,7,8-TCDD TEQs is based on an *industrial* scenario and a target risk of 1E-04.

CH2M-Jones Response Clarification:

Dioxin detections in soil duplicate samples from AOC 620 were 3 orders of magnitude lower than the 1,000 ng/kg TEQ PRG quoted, and therefore were not considered to be of concern at the site.

Comment 6:

Page 7.10, "Summary of COPCs" paragraph makes the statement that "If no groundwater impacts were identified, the current soil concentrations were considered sufficiently protective of the underlying aquifer". The Department does not necessarily agree with this statement. Other factors as age of the unit, age of spills, type of contaminants present, barriers present (asphalt, concrete, etc.) would influence the presence of contaminants in groundwater. Please modify this statement and consider this factor when making this statement in reference to a specific unit.

Navy/EnSafe Response 6:

The factors mentioned above will be considered when evaluating soil's potential impact to the groundwater.

CH2M-Jones Response Clarification:

See document "Response to Reply to Comment Responses" for the revised EnSafe response.

Comment 7:

It may be appropriate to determine a background reference concentration, at Zone F soil and groundwater, for chemicals considered essential nutrients specially for iron. This natural nutrient has been detected at higher concentrations than usual throughout this zone and may be of concern. An evaluation can not be properly done at this time without having an appropriate background concentration and it has been dismissed many times without further consideration. This should be corrected in the final RFI report.

Navy/EnSafe Response 7:

Printouts of iron detections in both soil and groundwater exhibit smooth distributions with one high anomalous concentration in each case. Iron in soil samples appears to correlate closely with aluminum, indicating that high concentrations of both metals are related to high percentages of clay in the sample. Scatterplots of iron vs. aluminum would help confirm this interpretation, and would also make it possible to identify individual samples with genuinely anomalous high iron concentrations.

Agreed, a background concentration should be developed for iron. Since iron is an essential nutrient, there is no clear guidance for iron risk assessment for human health and therefore no clear risk based remedial alternatives to the background concentration. For sites with iron reported at concentrations above the background reference concentration it is highly recommended that the Project Team develop a framework for managing such sites. However, it will be necessary to do so with a minimum of risk based decision making tools.

CH2M-Jones Response Clarification:

Background concentrations for iron are identified from grid samples from combined Zones F and G.

Comment 8:

This comment is applicable to all units in Zone F. The Risk uncertainty section generally summarizes all detections and explain contributing or mitigating factors to be considered when reaching a decision on the fate of the unit. Since groundwater contamination is assessed based mainly on the first quarter of groundwater sampling, mitigating or contributing factors, such as results of subsequent rounds of groundwater sampling that confirm or refute possible contamination, should be acknowledged. Also, new contaminants detected should be mentioned. Please review the report.

Navy/EnSafe Response 8:

The Navy agrees and will evaluate all available data for incorporation into the final report.

Comment 11:

SWMU 36/AOC 620

There is one detection of 4-methylphenol in subsurface soil at 036SB001. There were no samples collected from the subsurface soil around this detection to determine if is isolated. The extent of this contaminant should be delineated.

Navy/EnSafe Response 11:

Subsurface samples were collected from 620SB005 and 620SB009 adjacent to 620SB001. No subsurface sample was collected from 619SB0011.

CH2M-Jones Response Clarification:

There is no subsurface source for contaminants in the vicinity of SWMU 36 (i.e., no below grade piping or structures), so any release would first contact surface soil beneath the supported floor. There were no detections of 4-methylphenol in the surface soils in the SWMU 36 area. Furthermore, the compound was not detected in groundwater in the monitoring wells near 036SB001. Therefore, further investigation of 4-methylphenol is not warranted.

Comment 12:

The presence of PCBs, lead, chromium is not defined at these units. Detections exceeding RBCs/SSLs were found on samples where only surface soil samples were collected. The concentration gradient with depth has not been verified. The extent of these constituents should be delineated. Comment #6 is applicable when concluding that concentrations of contaminants present may be protective of groundwater due to the presence of "barriers".

Navy/EnSafe Response 12:

Subsurface soil samples were not collected due to a shallow water table. PCBs were not detected in site groundwater samples. Chromium and lead were detected but only lead

exceeded the RBC and MCL of 15 µg/L during only one sampling event.

CH2M-Jones Response Clarification:

Additional delineation of these contaminants has been conducted and is described in this RFI Report Addendum.

Comment 13:

Table 2.7 should be rectified to show that manganese does exceed the listed Tap water RBC. Please correct. Additionally, the statement made on page 10.2.60, section 10.2.5.4 is not correct. Organic exceedances in soil are repeated in groundwater at well 620001 second quarter. Please correct.

Navy/EnSafe Response 13:

The table and the resulting statements in the Fate and Transport Section will be revised accordingly.

CH2M-Jones Response Clarification:

Although manganese concentrations in groundwater are higher than the RBC adjusted for HI=0.1, they are less than the background reference concentration. Therefore, manganese is not a COPC at AOC 620. The table will not be revised for the RFI Report Addendum. In addition, the isolated detection of 4-methylphenol in monitoring well 620GW001, which is upgradient of the location in which the compound was detected in soil, is not significant. A discussion of 4-methylphenol is provided in the RFI Report Addendum.

Comment 14:

Figure 10.2.15 was not included in the draft report. The final report should include this figure as appropriate.

Navy/EnSafe Response 14:

The distribution of thallium in shallow groundwater, Figure 10.2-15 will be included in the final report.

CH2M-Jones Response Clarification:

Thallium was only detected during the first sampling events at the monitoring wells; it was not detected in the subsequent three sampling events. There is no distribution of thallium in shallow groundwater to present.

Comment 15:

Wells 3 and 4 were analyzed for metals only. There is lack of data to verify the presence of organics downgradient from building 68 which were detected in surface soil (when analyzed). Additional groundwater samples are needed to verify the presence/absence of these contaminants on the downgradient side of this unit. Please propose additional work to fill all data gaps.

Navy/EnSafe Response 15:

Wells 620003 and 620004 were installed subsequently to monitor elevated metals in SWMU 36 soil. The original decision to sample for metals only was approved by the Project Team.

CH2M-Jones Response Clarification:

Three samples from monitoring wells 620GW003 and 620GW004 were analyzed for SVOCs, VOCs, and metals. Details from this analysis are provided in the RFI Report Addendum.

Comment 16:

The first paragraph on Page 10.2.90 states "the assumption was made that this child would ingest 0.1 grams of soil from the most heavily contaminated area ..." This approach sounds appropriate, except that the concentration used was the mean concentration not the maximum detected. For groundwater, the highest concentration was used for the toxicity calculations related to lead. The approach should remain consistent by using the highest detection as described in the text. Please revise. In addition, lead should be identified as a COC. After the lead toxicity calculations are made, lead is not mentioned thereafter, not even in the COC summary section. This oversight should be corrected.

Navy/EnSafe Response 16:

No inconsistencies were identified for the evaluation described above. RAGS Part A provides for averaging concentrations over a hot spot area to estimate exposure. This approach was used to evaluate lead concentrations in SWMU 36 soil under a future commercial/industrial scenario. Since there was no readily definable lead plume the highest concentration of lead in the plume could only be represented by data from a single monitoring well. Since only one round of groundwater sample data was available, the maximum concentration was used as the drinking water input to the Lead Model. Since the revised report will consider all rounds of groundwater sampling the average lead concentration for all groundwater samples collected for the monitoring well reporting the highest lead concentration will be used as the drinking water input to the Lead Model. Lead is a COC for the residential scenario and will be added to the list of COCs in the revised report.

CH2M-Jones Response Clarification:

Lead is considered a COC in soil and has been remediated by interim action. The average lead concentration in groundwater at the monitoring well reporting the highest concentration is 8 micrograms per liter (µg/L), less than the MCL. The data indicate that lead is no longer present in groundwater at AOC 620 at concentrations above background levels.

SCDHEC Comments Prepared by Eric Cathcart (June 25, 1999)

Comment 1:

Soil sample blanks for the following areas contained detectable contaminants: SWMU 4, AOC 619, SWMU 36, AOC 620, SWMU 109, AOC 607, AOC 609, AOC 611, AOC 613, AOC 616, AOC 617, and Grid soil samples. Groundwater blanks contained detectable contaminants for the following areas: AOC 619, AOC 620, SWMU 109, AOC 607, AOC 609, AOC 613, GEL samples, Location 240, AOC 617, and Grid groundwater samples. These detections were noted in the volatile, semivolatile, and metals methods. In accordance with the Environmental Protection Agency, Standard Operating Procedures for sample collection, trace contaminants in field, trip, equipment, and distilled water blanks may indicate a problem with either decontamination procedures and/or cross contamination of samples during collection or transport. The RFI report should fully explain the existence of trace contaminants in blanks. Please revise the text to include this/these explanation(s).

Navy/EnSafe Response 1:

The Project Chemist has reviewed and evaluated the data and compiled the findings in the following memo to the Project Team for review and approval.

Memorandum

To: Charleston Naval Complex Project Team
From: Charlie Vernoy, EnSafe
Subject: Response to Comments on the Draft Zone F and K RFI Reports
Date: March 31, 1999

Contents of the memorandum not included. Refer to original comment letter.

SCDHEC Response:

The presence of tetrachloroethene in the field and method blanks for groundwater samples and the Navy's suggestion that cross contamination may have occurred between samples for AOC 607 concerns the Department. The Navy should make every effort to prevent cross contamination in future samples. Field personnel should review the procedures for sample collection and shipment as noted in CVA Final Comprehensive Sampling and Analysis Plan dated 30 August 1994 and the EPA Region IV Environmental Compliance Branch Standard Operating Procedures and Quality Assurance Manual.

The Navy's explanation for the high incident of metals in the field blanks should be validated through water quality data from the North Charleston Water System. The data report should be submitted within ninety days of receipt of this letter.

Navy/EnSafe Response:

EnSafe will contact the City of North Charleston to inquire if such data is available and, if so, obtain a copy for comparison to the metals detected in Zone F field blanks.

CH2M-Jones Response Clarification:

Data from the City for the time period during described sampling are not available for comparison.

SCDHEC Comments Prepared by Johnny Tapia

Comment 4:

The second paragraph of page 6.16 needs to be revised for the statements made about the use of the highest of background values (upper or lower soil) used as the screening alternative to SSLs. The same approach is mentioned for groundwater where the greater of shallow or deep background concentrations is used as an screening alternative to the tap water RBCs. Using this approach defeats the purpose of collecting two set of samples (upper and lower) to determine background reference concentrations and is not a conservative screening process. In addition, the same paragraph states that this approach is proposed based only on assumptions. The Screening process should continue as previously approved. Please revise this paragraph and consider implications throughout the report.

Navy/EnSafe Response 4:

The text will be modified to clarify that only SSLs will be used for the initial fate and transport screening. Inorganic SSL exceedances will be compared to background concentrations for discussion purposes only. Because the migration path, soil-to-groundwater, crosses through both soil intervals, the greater background will be used for this comparison.

As stated in the paragraph in question on page 6.16, the lithology of the surficial aquifer in Zone F is complex. Given the uncertainty about the interconnectedness of the portions of the aquifer encountered in each well, groundwater results from each depth (shallow or deep) will be screened only against background reference values from the corresponding depth for the final report.

Comment 6:

Page 7.10, "Summary of COPCs" paragraph makes the statement that "If no groundwater impacts were identified, the current soil concentrations were considered sufficiently protective of the underlying aquifer". The Department does not necessarily agree with this statement. Other factors as age of the unit, age of spills, type of contaminants present, barriers present (asphalt, concrete, etc.) would influence the presence of contaminants in groundwater. Please modify this statement and consider this factor when making this statement in reference to a specific unit.

Navy/EnSafe Response 6:

The Navy agrees and will revise the text in Section 7. Site specific factors potentially affecting the soil-to-groundwater pathway will be identified and discussed as appropriate for the site. This information will be added to the fate and transportation subsections of Section 10 text.

CH2M-Jones Response Clarification:

CH2M-Jones is screening soil parameters for COPCs using the soil screening process, as agreed upon with SCDHEC.

Comment 11:

There is one detection of 4-methylphenol in subsurface soil at 036SB001. There were no samples collected from the subsurface soil around this detection to determine if is isolated.

The extent of this contaminant should be delineated.

Navy/EnSafe Response 11:

Subsurface samples were collected from 620SB005, 620SB007, and 620SB009 adjacent to Building 69. Subsurface samples were not collected from adjacent locations 036SB002, 036SB003, and 620SB004 due to either a shallow water table or obstructions in the borehole. Resampling for the subsurface interval could be attempted during these drier summer months to determine extent. If the question is potential impact to shallow groundwater, monitoring well 620004 is located directly downgradient of the subsurface SSL exceedance of 4-methylphenol. This well did not detect the compound. Another well 620001 did detect this SVOC during one sampling event at concentrations below the RBC. No MCL is available for this compound.

CH2M-Jones Response Clarification:

See response clarification in initial responses to Comments.

Comment 16:

The first paragraph on Page 10.2.90 states "the assumption was made that this child would ingest 0.1 grams of soil from the most heavily contaminated area ..." This approach sounds appropriate, except that the concentration used was the mean concentration not the maximum detected. For groundwater, the highest concentration was used for the toxicity calculations related to lead. The approach should remain consistent by using the highest detection as described in the text. Please revise. In addition, lead should be identified as a COC. After the lead toxicity calculations are made, lead is not mentioned thereafter, not even in the COC summary section. This oversight should be corrected.

Navy/EnSafe Response 16:

No inconsistencies were identified for the evaluation described above. RAGS Part A provides for averaging concentrations over a hot spot area to estimate exposure. This approach was used to evaluate lead concentrations in SWMU 36 soil under a future commercial/industrial scenario. Since there was no readily definable lead plume the highest concentration of lead in the plume could only be represented by data from a single monitoring well. Since only one round of groundwater sample data was available, the maximum concentration was used as the drinking water input to the Lead Model. Since the revised report will consider all rounds of groundwater sampling the average lead concentration for all groundwater samples collected for the monitoring well reporting the highest lead concentration will be used as the drinking water input to the Lead Model. Lead is a COC for the residential scenario and will be added to the list of COCs in the revised report.

The hot spot area used to average the lead concentrations was comprised of 036SB001, 036SB002, 036SB003, 620SB003, 620SB004, and 620SB007. The actual results are presented in Table 10.2.4, page 10.2.26.

CH2M-Jones Response Clarification:

See response clarification in initial responses to Comments.

SCDHEC Comments Prepared by Susan Byrd

Comment 1:

Section 6.2.1, Page 6.11, Line 20

The text states that the soil-to-groundwater migration pathway was assessed using generic SSLs that assume a DAF of 20, rather than site specific SSLs. A vague description was given for the justification of the DAF value used; however, a more thorough explanation as to why the DAF value of 20 was selected, including site specific parameters, should be discussed in this section. A table showing the comparative site specific values should be included.

Navy/EnSafe Response 1:

Because of the number of sites in each zone, fate and transport evaluation consists of a conservative, first-look screening followed by a more detailed look at the potential problem chemicals identified in the screening. In keeping with the preliminary nature of the screening, generic DAFs of 10 or 20 have been used to calculate SSLs for protection of groundwater. Normally, a DAF of 20 is used, as recommended in the 1996 USEPA Soil Screening Guidance. Where hydrogeological conditions indicate that a more conservative value is appropriate, a DAF of 10 is used. For example, DAFs of 10 were used for the Naval Annex in Zone K because sediments there are almost entirely permeable sand, and for Zone I because groundwater levels are very close to the surface and the horizontal gradient is unusually low. Fate and transport evaluation for Zone E was carried out differently than for other zones: recognizing that groundwater would not be used as drinking water in this industrial area, the focus was on potential threats to surface water in the Cooper River. To make up for this less conservative approach to groundwater, the DAF was arbitrarily lowered from 20 to 10, although hydrogeological conditions would have justified using 20. The decision to use a DAF of 20 was not dependant on site specific parameters. The rationale for using a DAF of 20 for Zone G is presented in Section 6.3.

CH2M-Jones Response Clarification:

As agreed to by the BCT, DAFs of 1 for VOCs and 10 for other parameters have been used for initial screening. Site-specific DAFs have been calculated for chemicals that exceed initial SSL screening values.

Comment 2:

Section 6.2.1, Page 6.16, Line 1

The text state that the greater of the background reference values for surface soil and subsurface soil was used as the screening alternatives to SSLs for inorganics. Using the highest background reference value does not seem to be a conservative approach for background comparison. An explanation should be given to support the statement that the higher background value is always relevant. Also, the approach of comparing surface soils to subsurface soils is not supported due to the influence to "natural occurring" surface soils from the Naval activities such as land covering with dredge materials. To resolve comparing "apples to oranges", compare surface soil background levels solely to surface soil samples and subsurface soil background levels to subsurface samples.

Navy/EnSafe Response 2:

The text will be modified to clarify that only SSLs will be used for the initial fate and transport screening. Because the migrating soil water is exposed to background concentrations of soil constituents at each level, the only relevant background concentration for fate and transport comparisons is the greater of the surface soil or subsurface soil values. The surficial soil (less than 5 feet bgs) throughout Zone G is an extremely heterogeneous composite of native soil and dredge spoil and other fill materials. It would not be feasible to accurately identify, characterize and determine background concentrations for each soil type encountered.

Comment 3:

Section 7.3.4, Page 7.8, Line 22

The terms "significantly greater" is vague and should be defined more clearly or deleted from the text.

Navy/EnSafe Response 3:

The adjective "significantly" will be deleted from the revised text.

Comment 4:

Section 7.3.9, Page 7.19, Line 16

The text states that parameters not having RBC values were not included in the CDI calculation data. EPA Risk Assessment Guidance for Superfund recommends alternative measures when toxicity values are not available. An alternative measure should be implemented in order to prevent deleting values from the calculations.

Navy/EnSafe Response 4:

Parameters that do not have corresponding RBCs due to the lack of approved toxicological data were not included in the CDI calculations. For Zone F media, only essential nutrients were not included due to a lack of quantitative toxicity values. Perhaps SCDHEC and/or the CNC Project Team could assist in identifying the necessary toxicity values.

Comment 5:

Section 8.0, Page 8.1, Lines 2-10

A better justification should be provided for not conducting the Ecological Risk Assessment since receptors were identified in the text. The fact that no Zone F AECs were identified in earlier investigations could be one rationale. Emphasis should be placed on the size of the areas and the unlikelihood that the species identified reside in the areas for prolonged periods of time. Further justification as to why the habitat is considered "limited" should be provided.

Navy/EnSafe Response 5:

The text will be modified to more fully justify the decision not to conduct a Ecological Risk Assessment based on a lack of AECs in Zone F.

Comment 6:
Section 10.1

It would be very helpful to have a map at the beginning of each SWMU and AOC section showing the location of each SWMU or AOC within Zone F. The maps provided in each section are larger scale maps of the SWMUs and AOCs which do not show their locations within the entire Zone.

Navy/EnSafe Response 6:

This information is provided as Figure 1-2 in Volume I of the RFI.

CH2M-Jones Response Clarification:

A location map will be provided at the beginning of each AOC or SWMU section.

Comment 9:

Section 10.2.5.3, Page 10.2.60, Line 3-4

The text states that two VOCs were detected in site soils; however the referenced table 10.2.10 shows the five VOCs were detected. The text should be modified to reflect the correct number of detected VOCs.

Navy/EnSafe Response 9:

The text will be revised to rectify this error.

CH2M-Jones Response Clarification:

The soil-to-air cross-media transport pathway is not significant at this site and will not be discussed in the RFI Report Addendum.



ENSAFE INC.

ENVIRONMENTAL AND MANAGEMENT CONSULTANTS

313 Wingo Way • Mt. Pleasant, South Carolina 29464 • Telephone 843-884-0029 • Facsimile 843-856-0107 • www.ensafe.com

July 30, 2001

Paul Bergstrand
Department of Health and Environmental Control
Bureau of Solid and Hazardous Waste
8901 Farrow Road
Columbia, South Carolina 29203

RE: Submittal of Well Construction Diagrams for Replacement Wells at Charleston Naval Complex, Charleston, SC.

Dear Mr. Bergstrand:

On behalf of the Southern Division Naval Facility Engineering Command, EnSafe Inc., is submitting copies of well construction diagrams for the following wells installed in the surficial aquifer under permit no. HW-01-018:

Replacement Well:

NBCA002009
NBCC508004
NBCC512004
NBCC512005
NBCE021004
NBCE053002
NBCE065009
NBCE542005
NBCE550002
NBCE605004
NBCEGDE17A
NBCEGDE20A
NBCF620005
NBCG120004
NBCH00922R
CNC27-MW01R*
GEL01R*
GEL14R*
131302R*

Replaces Decommissioned Well:

NBCA002002 ▼
NBCC508003
NBCC512002
NBCC512003
NBCE021003 ▼
NBCE053001 ▼
NBCE065007 ▼
NBCE542001 ▼
NBCE550001 ▼
NBCE605002
NBCEGDE017 ▼
NBCEGDE020 ▼
NBCF620003
NBCG120001
NBCH009022 ▼
CNC27-MW01*
GEL001*
GEL014*
1313002*

These wells were installed to replace decommissioned wells at CNC. Wells that have been physically decommissioned in accordance with Section 5.0 of Revision No. 01 of the *Final Comprehensive Sampling and Analysis Plan (CSAP)* and in compliance with South Carolina Well

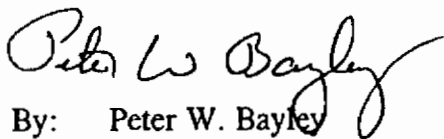
Standards and Regulations R. 61-71 are denoted by ▼ in the above listing. Such decommissioning was possible only when well bores could be recovered and grouted. If no well bore could be recovered the well was administratively decommissioned and the replacement well installed. Well locations denoted by * in the above listing were not installed as part of RFI activities at CNC. Attached are five maps depicting locations of replacement wells.

Well installations for all wells except GEL14R were performed using Hollow Stem Auger methods. Rotasonic drilling was used for installation of GEL14R in order to advance the well boring through concrete encountered below the surface. No lithologic data were collected during installation of replacement wells. Lithologic data from the decommissioned well being replaced were incorporated into the replacement well construction log.

Well development information is also attached with this submittal. Well development was attempted on all replacement wells except GEL14R. Development was of limited success in wells NBCE\GDE17A, and NBCE\605004 which were of low yield. No readings are reported for water removed from GEL01R since only five gallons were purged due to very low yield.

Please do not hesitate to call if you have any questions, or if we can be of further assistance.

Sincerely,
EnSafe Inc.



By: Peter W. Bayley
Hydrogeologist

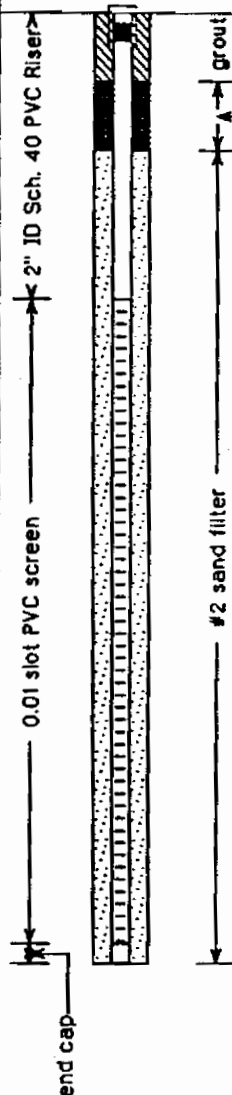
Enclosures

cc: Rob Harrell SOUTHDIIV (with attachments)
Project file 0157-001 (with attachments)

ENSAFE

Project: ZONE F - Naval Base Charleston	Coordinates: 2320389.9 E, 373077.9 N
Location: Charleston, SC	Surface Elevation: 10.3 feet msl
Started at 1430 on 3-29-01	TOC Elevation: 10.08 feet msl
Completed at 1515 on 3-29-01	Depth to Groundwater: 6.59 feet TOC Measured: 4-12-01
Drilling Method: 4.25" ID (7.5" OD) HSA	Groundwater Elevation: 3.49 feet msl
Drilling Company: PROSONIC SC cert. #889	Total Depth: 14.0 feet
Geologist: J. Watson	Well Screen: 4.2 to 13.7 feet

DEPTH IN FEET	LITHOLOGIC SAMPLE	ANALYTICAL SAMPLE	SAMPLE NO.	OVA (ppm)	% RECOVERY	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION	ELEV. (ft-msl)	WELL DIAGRAM
								Surface conditions: gravel and grass.		
									7.3	
							FILL	Fill: loose, medium grain, brown sand with gravel.	6.8	
5			1	0	25					
10			2	0			CL CH	Clay: green; sandy; fat; tight; stiff; damp.	3	
							SC	Sand: medium to coarse; loose; clayey; wet.	7	
			3	0	70				17	
							SC	Sand: green; as above w/ low plasticity clay.	27	
							CH	Clay: red-green mottled; silty; fat; tight; damp.	37	
15			4	0	100				47	
								Above lithologic descriptions are from well boring NBCF620003 (logged by S. Weatherford) which was abandoned and replaced by this well (NBCF620005).		
20										





2600 Bull Street
Columbia, SC 29201-1708

23 March 2001

CERTIFIED MAIL

Mr. Matt Humphreys, P.E.
Caretakers Site Office
1895 Avenue F
Charleston Naval Base
North Charleston, SC 29405

RE: Naval Base Charleston (CNAV)
Charleston, South Carolina
SC0-170-022-560

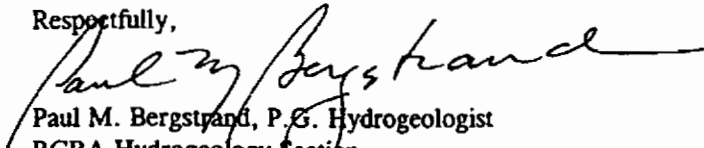
Monitoring Well Request for Replacement Wells
Well Repairs, Abandonment and Replacement
Revision 0, Dated 21 March 2001

Dear Mr. Humphreys:

The above referenced request has been reviewed with respect to R.61-79.265 Subpart F of the South Carolina Hazardous Waste Management Regulations and R.61-71 of the South Carolina Well Standards and Regulations. This request is for the installation of up to twenty five wells to replace damaged wells within the surficial aquifer. The replacement wells should be completed to a maximum depth of approximately fifty feet.

Attached, please find a copy of the proposed well locations. A copy of the well approval form and this letter should be on site during drilling operations. Additional assessment may be required at these well locations. Should there be any questions, please contact me at (803) 896-4016.

Respectfully,


Paul M. Bergstrand, P.G. Hydrogeologist
RCRA Hydrogeology Section
Division of Hydrogeology
Bureau of Land and Waste Management

Enclosures
PMB/pmb
HW-01-018

CC: Christine Sanford-Coker, Trident District EQC
Michael Bishop, BOW
Mihir Mehta, Hazardous Waste Permitting Section
Rob Harrell, P.E., Southern Division, Charleston
Todd Haverkost, EnSafe, Mount Pleasant, SC 29464
Dean Williamson, CH2M Hill, 3011 S.W. Williston Road, Gainesville, FL 32608-3928



2600 Bull Street
Columbia, SC 29201-1708

Well Installation Approval

Approval is hereby granted to: Mr. Humphreys, P.E., of Naval Base Charleston for

Replacement Monitoring Wells, Twenty Five various locations
Naval Base Charleston
Charleston County

for the construction of monitoring wells designated in accordance with the construction plans and specifications submitted to the Department on 21 March 2001, (Bailey to Bergstrand). The wells will be constructed within the surficial aquifer to a maximum depth of approximate fifty feet below the surface to replace damaged monitoring wells.

Conditions:

1. A driller certified to operate in the State of South Carolina must install the wells.
2. That the latitude and longitude, surveyed elevations, boring and/or geologist logs, and actual construction details for each direct push well point be submitted to the Department within 30 days after installation of the last well point. The collection of GPS data is encouraged.
3. All well construction and sampling derived wastes, including but not limited to, drill cuttings and fluids, development and purge water, must be managed properly and in accordance with all applicable state and federal requirements. If containerized, each vessel shall be clearly labeled with regard to contents, source, and date of activity.
4. That the wells are labeled with an identification plate constructed of a durable material affixed to the casing or surface pad where it is readily visible. The plate shall provide the monitoring well identification number, date of construction, static water level and driller name and state certification number.
5. Field equipment, including sampling probes, must be decontaminated by steam cleaning or other suitable methods before use and between sampling locations. Well screens and casing must be decontaminated before installation.
6. That notice be given to Christine Sanford-Coker, Charleston District EQC Hydrogeologist, during normal business hours at (803) 740-1590 a minimum of 48 hours before the initiation of drilling activities.

This approval is pursuant to the provisions of Section 44-55-40 of the 1976 South Carolina Code of Laws and the Department of Health and Environmental Control Well Standards and Regulations, R.61-71.

Date of Issue: 23 March 2001

Approval Number: HW-01-018

Paul M. Bergstrand, P.G. Hydrologist
RCRA Hydrogeology Section
Division of Hydrogeology
Bureau of Land and Waste Management



ENSAFE INC.

ENVIRONMENTAL AND MANAGEMENT CONSULTANTS

313 Wingo Way • Mt. Pleasant, South Carolina 29464 • Telephone 843-884-0029 • Facsimile 843-856-0107 • www.ensafe.com

March 21, 2001

RECEIVED

MAR 22 2001

Mr. Paul Bergstrand
Bureau of Solid and Hazardous Waste
South Carolina Department of Health and Environmental Control
8901 Farrow Road
Columbia, SC 29203

HYDROGEOLOGY

HW-01-018
DD010202.PMB

Re: Request for RFI Monitoring Well Permit
Charleston Naval Complex: CTO 0157-Well Repairs

TRACKED MWMP
Complete

Dear Mr. Bergstrand:

23 Mar 2001 RMB

EnSafe is performing inspections and repairs to monitoring wells at Charleston Naval Complex (CNC) on behalf of the Navy.

As a result of inspections to date EnSafe is requesting the installation of twenty-five (25) replacement monitoring wells at CNC. Nineteen (19) shallow well locations have been identified for decommissioning because either well integrity has been compromised, or the location was not found during a well inventory survey conducted by the Navy during October and November 2000. However, current well inspections and location recovery efforts are still in progress and a final counting is not available. Consequently, there may be other wells which will need to be decommissioned and have replacement wells installed. However, some locations may be successfully recovered and replacement wells will not be required. EnSafe is requesting a monitoring well permit for twenty-five (25) well locations to allow for additional wells that may require replacement and provide flexibility in completing this task. These wells will be identified and provided to DHEC prior to installation.

Wells that have been identified for decommissioning and respective replacements are listed as follows:

Decommission	Replacement Well
Zone A	
002007	002009

Decommission	Replacement Well
Zone C	
508003	508004
512002	512004
512003	512005
Zone E	
021003	021004
053001	053002
065007	065009
542001	542005
550001	550002
563003	563004
GDE011	GDE11A
GDE017	GDE17A
GDE020	GDE20A
605002	605004
Zone F	
607012	607021
620003	620004
Zone G	
120001	120004
Zone H	
136001	136002
Zone L (I)	
037I01	037I02

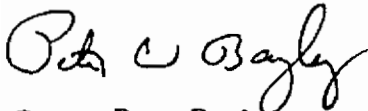
EnSafe proposes that wells which have been lost will be recovered using survey coordinates and geophysical methods to minimize the search area. A two (2) foot area around each well location will be excavated to a depth six (6) inches below the historical grade to locate the well boring. Well borings which have been recovered will be drilled out using hollow stem auger drilling techniques and grouted back to within two feet of surface. The decommissioned well location will then be back-filled and paved if necessary to match the surrounding surface materials. If a well location cannot be recovered as described above the excavated area will

Mr. Paul Bergstrand
March 21, 2001
Page 3

be backfilled and re-paved if necessary leaving the wells in place. A site map illustrating locations of wells scheduled for decommissioning and replacement is attached. Installation of the two-inch diameter PVC replacement wells is to be as close as practicable to the well which is being replaced. Replacement well depths will range from 12 to 15 feet bgs. EnSafe wishes to begin well installation during the week of 26 March, 2001, contingent upon your approval.

All well decommissioning, and replacement well installation and development will be performed in accordance with Section 5.0 of Revision No. 01 of the *Final Comprehensive Sampling and Analysis Plan* (CSAP) and in compliance with South Carolina Well Standards and Regulations R. 61-71.

Sincerely,
EnSafe Inc.



By: Peter Bayley
Hydrogeologist

Attachment

cc: Christine Coker, SCDHEC, w/attachment
Rob Harrell, SOUTHDIV, w/attachment
Project File, 0157-001, w/attachment



ENSAFE

Analytic Data Summary

02/17/20 12:07 PM

Soil Cyanide

StationID	F620SB008	F620SB008	F620SB008	F620SB008
SampleID	620SB008S1 (0-1ft)	620SB008S2 (3-5ft)	620SB008T1 (0-1ft)	620SB008T2 (3-5ft)
DateCollected	10/15/1999	10/15/1999	10/15/1999	10/15/1999
DateExtracted	10/22/1999	10/27/1999	10/28/1999	10/29/1999
DateAnalyzed	10/27/1999	10/28/1999	10/29/1999	11/1/1999
SDGNumber	EN022	EN023	EN022	EN023
Parameter	Units			
Cyanide, SPLP	mg/L			
Cyanide	mg/Kg			

0.01 U

0.01 U

0.5 U

0.6 U

Analytical Data Summary

02/17/2003 12:07 PM

Soil General Chemistry

StationID	F620SB008	F620SB008
SampleID	620SB008T1 (0-1ft)	620SB008T2 (3-5ft)
DateCollected	10/15/1999	10/15/1999
DateExtracted	11/2/1999	11/2/1999
DateAnalyzed	11/2/1999	11/2/1999
SDGNumber	EN022	EN023

Parameter	Units				
Total Organic Carbon	%, DR	5.8	=	2.4	=

Analytical Data Summary

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Soil Metals

Parameter	Units	F620SB008		F620SB008		F620SB008		F620SB008	
		StationID	SampleID	StationID	SampleID	StationID	SampleID	StationID	SampleID
			620SB008S1 (0-1ft)		620SB008S2 (3-5ft)		620SB008T1 (0-1ft)		620SB008T2 (3-5ft)
		DateCollected	10/15/1999	DateCollected	10/15/1999	DateCollected	10/15/1999	DateCollected	10/15/1999
		DateExtracted	10/22/1999	DateExtracted	10/22/1999	DateExtracted	10/25/1999	DateExtracted	10/19/1999
		DateAnalyzed	10/25/1999	DateAnalyzed	10/25/1999	DateAnalyzed	10/29/1999	DateAnalyzed	10/22/1999
		SDGNumber	EN022	SDGNumber	EN023	SDGNumber	EN022	SDGNumber	EN023
Tin (Sn), SPLP	ug/L	4	J	4	J				
Tin (Sn)	mg/Kg					7.3	J	5.9	U
Aluminum	mg/Kg					6750	=	16000	=
Aluminum, SPLP	ug/L	749	=	5990	J				
Antimony	mg/Kg					1.7	J	2.5	J
Antimony, SPLP	ug/L	2.4	U	2.4	U				
Arsenic	mg/Kg					15.1	J	18.9	=
Arsenic, SPLP	ug/L	27.4	=	4.2	J				
Barium	mg/Kg					27.2	=	139	=
Barium, SPLP	ug/L	128	J	422	=				
Beryllium	mg/Kg					0.31	J	0.47	J
Beryllium, SPLP	ug/L	0.9	U	0.9	U				
Cadmium	mg/Kg					0.29	J	0.43	J
Cadmium, SPLP	ug/L	0.3	U	0.5	U				
Calcium	mg/Kg					39600	J	14000	J
Calcium, SPLP	ug/L	10500	=	23800	=				
Chromium, Total	mg/Kg					32.8	J	269	J
Chromium, Total	ug/L	4.1	J	16.7	=				
Cobalt	mg/Kg					3.2	J	4.8	J
Cobalt, SPLP	ug/L	0.5	UJ	0.5	UJ				
Copper	mg/Kg					46.3	=	66.8	J
Copper, SPLP	ug/L	5.6	J	8	J				
Iron	mg/Kg					8790	=	19200	J
Iron, SPLP	ug/L	992	=	3890	J				
Lead	mg/Kg					89	=	105	J
Lead, SPLP	ug/L	8.9	U	11.8	U				
Magnesium	mg/Kg					1310	J	2220	J
Magnesium, SPLP	ug/L	594	J	3240	J				
Manganese	mg/Kg					110	=	401	J
Manganese, SPLP	ug/L	6.6	J	21	=				

Analytical Data Summary

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Soil Metals	StationID	F620SB010		F620SB010		F620SB011		F620SB011	
	SampleID	620SB01001b (0-1ft)		620SB01002 (3-5ft)		620SB01101d (0-1ft)		620SB01102b (3-5ft)	
DateCollected		11/17/1999		11/17/1999		11/16/1999		11/16/1999	
DateExtracted		11/22/1999		11/22/1999		11/29/1999		11/29/1999	
DateAnalyzed		11/23/1999		11/23/1999		11/30/1999		11/30/1999	
SDGNumber		EN028		EN028		EN028		EN028	
Parameter	Units								
Tin (Sn), SPLP	ug/L								
Tin (Sn)	mg/Kg	4.5	UJ	3.5	UJ	6.4	UJ	3.3	UJ
Aluminum	mg/Kg	5620	J	5970	J	8450	J	4740	J
Aluminum, SPLP	ug/L								
Antimony	mg/Kg	0.67	R	0.31	R	0.96	R	0.82	R
Antimony, SPLP	ug/L								
Arsenic	mg/Kg	2.6	J	1.1	J	4.8	J	2.9	J
Arsenic, SPLP	ug/L								
Barium	mg/Kg	34.3	J	12.8	J	15	J	11.5	J
Barium, SPLP	ug/L								
Beryllium	mg/Kg	0.16	J	0.16	J	0.33	J	0.19	J
Beryllium, SPLP	ug/L								
Cadmium	mg/Kg	0.03	UJ	0.03	UJ	0.07	UJ	0.02	UJ
Cadmium, SPLP	ug/L								
Calcium	mg/Kg	2360	J	568	J	22700	J	2030	J
Calcium, SPLP	ug/L								
Chromium, Total	mg/Kg	8	J	6.4	J	16.8	J	12.9	J
Chromium, Total	ug/L								
Cobalt	mg/Kg	21.5	J	0.91	J	12.1	J	1.6	J
Cobalt, SPLP	ug/L								
Copper	mg/Kg	4.4	=	1.1	J	17.5	J	7.7	J
Copper, SPLP	ug/L								
Iron	mg/Kg	4780	J	2070	J	8400	J	4440	J
Iron, SPLP	ug/L								
Lead	mg/Kg	97.7	J	4.9	J	26.7	J	18.2	J
Lead, SPLP	ug/L								
Magnesium	mg/Kg	418	J	296	J	1310	J	560	J
Magnesium, SPLP	ug/L								
Manganese	mg/Kg	30.1	J	17	J	99.7	J	51.3	J
Manganese, SPLP	ug/L								

Analytical Data Summary

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Soil Metals

Parameter	Units	F620SB012		F620SB012		F620SB013		F620SB013	
		620SB01201b (0-1ft)		620SB01202b (3-5ft)		620CB01301 (0-1ft)		620CB01302 (3-5ft)	
StationID	SampleID	11/16/1999		11/16/1999		11/16/1999		11/16/1999	
DateCollected	DateExtracted	11/29/1999		11/29/1999		11/29/1999		11/29/1999	
DateAnalyzed	SDGNumber	11/30/1999		11/30/1999		11/30/1999		11/30/1999	
		EN028		EN028		EN028		EN028	
Tin (Sn), SPLP	ug/L								
Tin (Sn)	mg/Kg	8.4	UJ	6.4	UJ	6.4	UJ	7.1	UJ
Aluminum	mg/Kg	6120	J	15400	J	11600	J	17400	J
Aluminum, SPLP	ug/L								
Antimony	mg/Kg	1.7	R	1.6	R	1.6	R	2.1	J
Antimony, SPLP	ug/L								
Arsenic	mg/Kg	27.3	J	16.1	J	12.5	J	15.2	J
Arsenic, SPLP	ug/L								
Barium	mg/Kg	21.9	J	44.3	J	30.3	J	35.8	J
Barium, SPLP	ug/L								
Beryllium	mg/Kg	0.33	J	1.1	=	0.73	=	0.97	=
Beryllium, SPLP	ug/L								
Cadmium	mg/Kg	0.14	UJ	0.03	UJ	0.03	U	0.11	J
Cadmium, SPLP	ug/L								
Calcium	mg/Kg	33200	J	7030	J	35300	J	33200	J
Calcium, SPLP	ug/L								
Chromium, Total	mg/Kg	21.6	J	48.8	J	31.8	J	43.4	J
Chromium, Total	ug/L								
Cobalt	mg/Kg	3.2	J	6.7	J	4.8	J	6.2	J
Cobalt, SPLP	ug/L								
Copper	mg/Kg	45	J	49.2	J	44.5	J	43.7	J
Copper, SPLP	ug/L								
Iron	mg/Kg	17300	J	23700	J	18500	J	22300	J
Iron, SPLP	ug/L								
Lead	mg/Kg	60.5	J	82.8	J	77.8	J	88.9	J
Lead, SPLP	ug/L								
Magnesium	mg/Kg	1410	J	3210	J	2270	J	2900	J
Magnesium, SPLP	ug/L								
Manganese	mg/Kg	189	J	302	J	242	J	296	J
Manganese, SPLP	ug/L								

Analytical Data Summary

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Soil Metals

Parameter	Units	F620SB013		F620SB013		F620SB014		F620SB014	
		620SB01301b (0-1ft)		620SB01302a (3-5ft)		620SB01401b (0-1ft)		620SB01402b (3-5ft)	
		11/16/1999		11/16/1999		11/16/1999		11/16/1999	
		11/29/1999		11/29/1999		11/29/1999		11/29/1999	
		11/30/1999		11/30/1999		11/30/1999		11/30/1999	
StationID	SampleID	EN028		EN028		EN028		EN028	
DateCollected	DateExtracted								
DateAnalyzed	SDGNumber								
Parameter	Units								
Tin (Sn), SPLP	ug/L								
Tin (Sn)	mg/Kg	6.2	UJ	10.1	UJ	3.7	UJ	4.1	UJ
Aluminum	mg/Kg	13000	J	18200	J	4860	J	7150	J
Aluminum, SPLP	ug/L								
Antimony	mg/Kg	1.3	R	1.9	R	0.62	R	0.66	R
Antimony, SPLP	ug/L								
Arsenic	mg/Kg	12.4	J	14.2	J	18.5	J	6.3	J
Arsenic, SPLP	ug/L								
Barium	mg/Kg	30.8	J	37.5	J	27.2	J	16.5	J
Barium, SPLP	ug/L								
Beryllium	mg/Kg	0.69	=	1	=	0.19	J	0.31	J
Beryllium, SPLP	ug/L								
Cadmium	mg/Kg	0.26	J	0.13	J	0.18	J	0.02	U
Cadmium, SPLP	ug/L								
Calcium	mg/Kg	65500	J	42700	J	82100	J	13500	J
Calcium, SPLP	ug/L								
Chromium, Total	mg/Kg	30.6	J	42.8	J	11.3	J	13	J
Chromium, Total	ug/L								
Cobalt	mg/Kg	4.7	J	6.8	J	2.2	J	2.4	J
Cobalt, SPLP	ug/L								
Copper	mg/Kg	43.3	J	52.1	J	45.1	J	14	J
Copper, SPLP	ug/L								
Iron	mg/Kg	15700	J	24500	J	4280	J	8210	J
Iron, SPLP	ug/L								
Lead	mg/Kg	78.2	J	88.3	J	44	J	27.9	J
Lead, SPLP	ug/L								
Magnesium	mg/Kg	2460	J	3360	J	2190	J	930	J
Magnesium, SPLP	ug/L								
Manganese	mg/Kg	239	J	323	J	84.1	J	121	J
Manganese, SPLP	ug/L								

Analytical Data Summary

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Soil Metals

Parameter	Units	StationID SampleID		F620SB008		F620SB008		F620SB008		F620SB008	
		DateCollected	DateExtracted	DateAnalyzed	SDGNumber	620SB008S1 (0-1ft)	620SB008S2 (3-5ft)	620SB008T1 (0-1ft)	620SB008T2 (3-5ft)	620SB008T1 (0-1ft)	620SB008T2 (3-5ft)
Nickel	mg/Kg	10/15/1999	10/22/1999	10/25/1999	EN022						
Nickel, SPLP	ug/L	10/15/1999	10/22/1999	10/25/1999	EN023	2.5	3.4	11.4	=	9.9	J
Potassium	mg/Kg	10/15/1999	10/22/1999	10/25/1999	EN022			698	J	1390	J
Potassium, SPLP	ug/L	10/15/1999	10/22/1999	10/25/1999	EN023	751	4040				
Selenium	mg/Kg	10/15/1999	10/22/1999	10/25/1999	EN022			0.8	J	1.7	=
Selenium, SPLP	ug/L	10/15/1999	10/22/1999	10/25/1999	EN023	1.7	3.2				
Silver	mg/Kg	10/15/1999	10/22/1999	10/25/1999	EN022			0.05	U	0.05	U
Silver, SPLP	ug/L	10/15/1999	10/22/1999	10/25/1999	EN023	0.5	0.5				
Sodium	mg/Kg	10/15/1999	10/22/1999	10/25/1999	EN022			270	J	325	J
Sodium, SPLP	ug/L	10/15/1999	10/22/1999	10/25/1999	EN023	963	2130				
Thallium	mg/Kg	10/15/1999	10/22/1999	10/25/1999	EN022			0.24	UJ	1.3	UJ
Thallium, SPLP	ug/L	10/15/1999	10/22/1999	10/25/1999	EN023	2.4	12				
Vanadium	mg/Kg	10/15/1999	10/22/1999	10/25/1999	EN022			17.5	=	36.4	=
Vanadium, SPLP	ug/L	10/15/1999	10/22/1999	10/25/1999	EN023	9.4	13.1				
Zinc	mg/Kg	10/15/1999	10/22/1999	10/25/1999	EN022			145	J	422	J
Zinc, SPLP	ug/L	10/15/1999	10/22/1999	10/25/1999	EN023	40.9	174				
Mercury	mg/Kg	10/15/1999	10/22/1999	10/25/1999	EN022			0.38	=	0.7	=
Mercury, SPLP	ug/L	10/15/1999	10/22/1999	10/25/1999	EN023	0.4	0.4				

Analytical Data Summary

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Soil Metals

Soil Metals	StationID	F620SB010		F620SB010		F620SB011		F620SB011	
	SampleID	620SB01001b (0-1ft)		620SB01002 (3-5ft)		620SB01101d (0-1ft)		620SB01102b (3-5ft)	
DateCollected		11/17/1999		11/17/1999		11/16/1999		11/16/1999	
DateExtracted		11/22/1999		11/22/1999		11/29/1999		11/29/1999	
DateAnalyzed		11/23/1999		11/23/1999		11/30/1999		11/30/1999	
SDGNumber		EN028		EN028		EN028		EN028	
Parameter	Units								
Nickel	mg/Kg	6.2	J	1.8	J	6.8	J	4.3	J
Nickel, SPLP	ug/L								
Potassium	mg/Kg	215	J	152	J	744	J	259	J
Potassium, SPLP	ug/L								
Selenium	mg/Kg	0.51	J	0.35	J	0.57	J	0.45	J
Selenium, SPLP	ug/L								
Silver	mg/Kg	0.41	J	0.04	U	0.04	U	0.04	U
Silver, SPLP	ug/L								
Sodium	mg/Kg	99.2	J	132	J	219	J	118	J
Sodium, SPLP	ug/L								
Thallium	mg/Kg	0.23	UJ	0.21	UJ	0.19	UJ	0.19	UJ
Thallium, SPLP	ug/L								
Vanadium	mg/Kg	23.6	J	4.4	J	18.2	J	9.1	J
Vanadium, SPLP	ug/L								
Zinc	mg/Kg	150	J	5.2	J	69.3	J	44.8	J
Zinc, SPLP	ug/L								
Mercury	mg/Kg	0.05	J	0.04	UJ	0.05	J	0.07	J
Mercury, SPLP	ug/L								

Analytical Data Summary

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Soil Metals

Parameter	Units	StationID	F620SB012	F620SB012	F620SB013	F620SB013
		SampleID	620SB01201b (0-1ft)	620SB01202b (3-5ft)	620CB01301 (0-1ft)	620CB01302 (3-5ft)
		DateCollected	11/16/1999	11/16/1999	11/16/1999	11/16/1999
		DateExtracted	11/29/1999	11/29/1999	11/29/1999	11/29/1999
		DateAnalyzed	11/30/1999	11/30/1999	11/30/1999	11/30/1999
		SDGNumber	EN028	EN028	EN028	EN028
Nickel	mg/Kg		8.3	J	16.9	J
Nickel, SPLP	ug/L					
Potassium	mg/Kg		722	J	1670	J
Potassium, SPLP	ug/L					
Selenium	mg/Kg		0.66	J	1.7	J
Selenium, SPLP	ug/L					
Silver	mg/Kg		0.04	U	0.05	U
Silver, SPLP	ug/L					
Sodium	mg/Kg		236	J	318	J
Sodium, SPLP	ug/L					
Thallium	mg/Kg		0.18	UJ	0.25	UJ
Thallium, SPLP	ug/L					
Vanadium	mg/Kg		17.4	J	46.4	J
Vanadium, SPLP	ug/L					
Zinc	mg/Kg		159	J	209	J
Zinc, SPLP	ug/L					
Mercury	mg/Kg		0.2	J	0.27	J
Mercury, SPLP	ug/L					

Analytical Data Summary

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Soil Metals

Parameter	Units	F620SB013		F620SB013		F620SB014		F620SB014	
		620SB01301b (0-1ft)		620SB01302a (3-5ft)		620SB01401b (0-1ft)		620SB01402b (3-5ft)	
		DateCollected		DateCollected		DateCollected		DateCollected	
		DateExtracted		DateExtracted		DateExtracted		DateExtracted	
		DateAnalyzed		DateAnalyzed		DateAnalyzed		DateAnalyzed	
		SDGNumber		SDGNumber		SDGNumber		SDGNumber	
Nickel	mg/Kg	13.2	J	18.7	J	6.7	J	5.3	J
Nickel, SPLP	ug/L								
Potassium	mg/Kg	1530	J	1930	J	609	J	439	J
Potassium, SPLP	ug/L								
Selenium	mg/Kg	0.73	J	1.1	J	0.53	J	0.72	J
Selenium, SPLP	ug/L								
Silver	mg/Kg	0.04	U	0.05	U	0.04	U	0.04	U
Silver, SPLP	ug/L								
Sodium	mg/Kg	297	J	368	J	224	J	114	J
Sodium, SPLP	ug/L								
Thallium	mg/Kg	0.21	UJ	0.24	UJ	0.19	UJ	0.2	UJ
Thallium, SPLP	ug/L								
Vanadium	mg/Kg	31.5	J	43	J	10.7	J	16.8	J
Vanadium, SPLP	ug/L								
Zinc	mg/Kg	173	J	214	J	32.1	J	49	J
Zinc, SPLP	ug/L								
Mercury	mg/Kg	0.22	J	0.35	J	0.04	UJ	0.07	J
Mercury, SPLP	ug/L								

Analytical Data Summary

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Soil PCBs

StationID		F620SB008		F620SB008		F620SB008		F620SB008	
SampleID		620SB008S1 (0-1ft)		620SB008S2 (3-5ft)		620SB008T1 (0-1ft)		620SB008T2 (3-5ft)	
DateCollected		10/15/1999		10/15/1999		10/15/1999		10/15/1999	
DateExtracted		10/21/1999		10/21/1999		10/19/1999		10/19/1999	
DateAnalyzed		10/23/1999		10/24/1999		10/28/1999		10/28/1999	
SDGNumber		EN022		EN023		EN022		EN023	
Parameter	Units								
PCB-1016 (Arochlor 1016), SPLP	ug/L	1	U	1	U				
PCB-1016 (Arochlor 1016)	ug/Kg					36	U	47	U
PCB-1221 (Arochlor 1221), SPLP	ug/L	2	U	2	U				
PCB-1221 (Arochlor 1221)	ug/Kg					73	U	94	U
PCB-1232 (Arochlor 1232), SPLP	ug/L	1	U	1	U				
PCB-1232 (Arochlor 1232)	ug/Kg					36	U	47	U
PCB-1242 (Arochlor 1242), SPLP	ug/L	1	U	1	U				
PCB-1242 (Arochlor 1242)	ug/Kg					36	U	47	U
PCB-1248 (Arochlor 1248), SPLP	ug/L	1	U	1	U				
PCB-1248 (Arochlor 1248)	ug/Kg					36	U	47	U
PCB-1254 (Arochlor 1254), SPLP	ug/L	1	U	1	U				
PCB-1254 (Arochlor 1254)	ug/Kg					36	U	47	U
PCB-1260 (Arochlor 1260), SPLP	ug/L	1	U	1	U				
PCB-1260 (Arochlor 1260)	ug/Kg					88	=	47	U

Analytical Data Summary

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Soil PCBs

		StationID	F620SB010	F620SB011	F620SB011
		SampleID	620SB01001a (0-1ft)	620SB01101c (0-1ft)	620SB01102a (3-5ft)
		DateCollected	10/15/1999	10/15/1999	10/15/1999
		DateExtracted	10/19/1999	10/19/1999	10/19/1999
		DateAnalyzed	10/28/1999	10/27/1999	10/27/1999
		SDGNumber	EN022	EN022	EN022
Parameter	Units				
PCB-1016 (Arochlor 1016), SPLP	ug/L				
PCB-1016 (Arochlor 1016)	ug/Kg	50	U	36	U
PCB-1221 (Arochlor 1221), SPLP	ug/L				
PCB-1221 (Arochlor 1221)	ug/Kg	100	U	73	U
PCB-1232 (Arochlor 1232), SPLP	ug/L				
PCB-1232 (Arochlor 1232)	ug/Kg	50	U	36	U
PCB-1242 (Arochlor 1242), SPLP	ug/L				
PCB-1242 (Arochlor 1242)	ug/Kg	50	U	36	U
PCB-1248 (Arochlor 1248), SPLP	ug/L				
PCB-1248 (Arochlor 1248)	ug/Kg	50	U	36	U
PCB-1254 (Arochlor 1254), SPLP	ug/L				
PCB-1254 (Arochlor 1254)	ug/Kg	50	U	36	U
PCB-1260 (Arochlor 1260), SPLP	ug/L				
PCB-1260 (Arochlor 1260)	ug/Kg	50	U	36	U

Analytical Data Summary

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Soil Pesticides

Parameter	Units	F620SB008		F620SB008		F620SB008		F620SB008	
		620SB008S1 (0-1ft)	620SB008S2 (3-5ft)	620SB008T1 (0-1ft)	620SB008T2 (3-5ft)	620SB008S1 (0-1ft)	620SB008S2 (3-5ft)	620SB008T1 (0-1ft)	620SB008T2 (3-5ft)
StationID									
SampleID									
DateCollected		10/15/1999	10/15/1999	10/15/1999	10/15/1999	10/15/1999	10/15/1999	10/15/1999	10/15/1999
DateExtracted		10/21/1999	10/21/1999	10/19/1999	10/19/1999	10/19/1999	10/19/1999	10/19/1999	10/19/1999
DateAnalyzed		10/23/1999	10/24/1999	10/28/1999	10/28/1999	10/28/1999	10/28/1999	10/28/1999	10/28/1999
SDGNumber		EN022	EN023	EN022	EN023	EN022	EN023	EN022	EN023
Aldrin, SPLP	ug/L	0.05	U	0.05	U				
Aldrin	ug/Kg					1.9	U	2.4	U
Alpha BHC (alpha hexachlorocyclohexane), SPLP	ug/L	0.05	U	0.05	U				
Alpha BHC (Alpha Hexachlorocyclohexane)	ug/Kg					1.9	U	2.4	U
Alpha-chlordane, SPLP	ug/L	0.05	U	0.05	U				
Alpha-chlordane	ug/Kg					7.7	J	7.7	=
Beta BHC (beta hexachlorocyclohexane), SPLP	ug/L	0.05	U	0.05	U				
Beta BHC (Beta Hexachlorocyclohexane)	ug/Kg					1.9	U	2.4	U
Delta BHC (delta hexachlorocyclohexane), SPLP	ug/L	0.05	U	0.05	U				
Delta BHC (Delta Hexachlorocyclohexane)	ug/Kg					1.9	U	2.4	U
Dieldrin, SPLP	ug/L	0.1	U	0.1	U				
Dieldrin	ug/Kg					3.6	U	4.7	U
Endosulfan I, SPLP	ug/L	0.05	U	0.05	U				
Endosulfan I	ug/Kg					1.9	U	2.4	U
Endosulfan II, SPLP	ug/L	0.1	U	0.1	U				
Endosulfan II	ug/Kg					3.6	U	4.7	U
Endosulfan Sulfate, SPLP	ug/L	0.1	U	0.1	U				
Endosulfan Sulfate	ug/Kg					3.6	U	4.7	U
Endrin aldehyde, SPLP	ug/L	0.1	U	0.1	U				
Endrin Aldehyde	ug/Kg					3.6	U	4.7	U
Endrin ketone, SPLP	ug/L	0.1	U	0.1	U				
Endrin Ketone	ug/Kg					3.6	U	4.7	U
Endrin, SPLP	ug/L	0.1	U	0.1	U				
Endrin	ug/Kg					3.6	U	4.7	U
Gamma BHC (lindane), SPLP	ug/L	0.05	U	0.05	U				
Gamma BHC (Lindane)	ug/Kg					1.9	U	2.4	U
Gamma-chlordane, SPLP	ug/L	0.05	U	0.05	U				
Gamma-chlordane	ug/Kg					11	J	9.9	=
Heptachlor Epoxide	ug/Kg					1.9	U	2.4	U
Heptachlor, SPLP	ug/L	0.05	U	0.05	U				

Analytical Data Summary

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Soil Pesticides

Parameter	Units	StationID		SampleID		DateCollected		DateExtracted		DateAnalyzed		SDGNumber	
		F620SB010		F620SB011		F620SB011		F620SB011		F620SB011		F620SB011	
		620SB01001a (0-1ft)		620SB01101c (0-1ft)		620SB01102a (3-5ft)		620SB01102a (3-5ft)		620SB01102a (3-5ft)		620SB01102a (3-5ft)	
		10/15/1999		10/15/1999		10/15/1999		10/15/1999		10/15/1999		10/15/1999	
		10/19/1999		10/19/1999		10/19/1999		10/19/1999		10/19/1999		10/19/1999	
		10/28/1999		10/27/1999		10/27/1999		10/27/1999		10/27/1999		10/27/1999	
		EN022		EN022		EN022		EN022		EN022		EN022	
Aldrin, SPLP	ug/L												
Aldrin	ug/Kg	2.6	U	1.9	U	1.9	U	1.9	U	1.9	U	1.9	U
Alpha BHC (alpha hexachlorocyclohexane), SPLP	ug/L												
Alpha BHC (Alpha Hexachlorocyclohexane)	ug/Kg	2.6	U	1.9	U	1.9	U	1.9	U	1.9	U	1.9	U
Alpha-chlordane, SPLP	ug/L												
Alpha-chlordane	ug/Kg	2.6	U	1.9	U	1.9	U	1.9	U	1.9	U	1.9	U
Beta BHC (beta hexachlorocyclohexane), SPLP	ug/L												
Beta BHC (Beta Hexachlorocyclohexane)	ug/Kg	2.6	U	1.9	U	1.9	U	1.9	U	1.9	U	1.9	U
Delta BHC (delta hexachlorocyclohexane), SPLP	ug/L												
Delta BHC (Delta Hexachlorocyclohexane)	ug/Kg	2.6	U	1.9	U	1.9	U	1.9	U	1.9	U	1.9	U
Dieldrin, SPLP	ug/L												
Dieldrin	ug/Kg	5	U	3.6	U	3.7	U	3.7	U	3.7	U	3.7	U
Endosulfan I, SPLP	ug/L												
Endosulfan I	ug/Kg	2.6	U	1.9	U	1.9	U	1.9	U	1.9	U	1.9	U
Endosulfan II, SPLP	ug/L												
Endosulfan II	ug/Kg	5	U	3.6	U	3.7	U	3.7	U	3.7	U	3.7	U
Endosulfan Sulfate, SPLP	ug/L												
Endosulfan Sulfate	ug/Kg	5	U	3.6	U	3.7	U	3.7	U	3.7	U	3.7	U
Endrin aldehyde, SPLP	ug/L												
Endrin Aldehyde	ug/Kg	5	U	3.6	U	3.7	U	3.7	U	3.7	U	3.7	U
Endrin ketone, SPLP	ug/L												
Endrin Ketone	ug/Kg	5	U	3.6	U	3.7	U	3.7	U	3.7	U	3.7	U
Endrin, SPLP	ug/L												
Endrin	ug/Kg	5	U	3.6	U	3.7	U	3.7	U	3.7	U	3.7	U
Gamma BHC (lindane), SPLP	ug/L												
Gamma BHC (Lindane)	ug/Kg	2.6	U	1.9	U	1.9	U	1.9	U	1.9	U	1.9	U
Gamma-chlordane, SPLP	ug/L												
Gamma-chlordane	ug/Kg	2.6	U	1.9	U	1.9	U	1.9	U	1.9	U	1.9	U
Heptachlor Epoxide	ug/Kg	2.6	U	1.9	U	1.9	U	1.9	U	1.9	U	1.9	U
Heptachlor, SPLP	ug/L												

Analytical Data Summary

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Soil Pesticides

Parameter	Units	StationID		SampleID		DateCollected		DateExtracted		DateAnalyzed		SDGNumber	
		F620SB008		F620SB008		F620SB008		F620SB008		F620SB008		F620SB008	
		620SB008S1 (0-1ft)		620SB008S2 (3-5ft)		620SB008T1 (0-1ft)		620SB008T2 (3-5ft)					
		10/15/1999		10/15/1999		10/15/1999		10/15/1999		10/15/1999		10/15/1999	
		10/21/1999		10/21/1999		10/19/1999		10/19/1999		10/19/1999		10/19/1999	
		10/23/1999		10/24/1999		10/28/1999		10/28/1999		10/28/1999		10/28/1999	
		EN022		EN023		EN022		EN023		EN022		EN023	
Heptachlor	ug/Kg					1.9	U	2.4	U				
Heptachlor epoxide, SPLP	ug/L	0.05	U	0.05	U								
Methoxychlor, SPLP	ug/L	0.5	U	0.5	U								
Methoxychlor	ug/Kg					19	U	24	U				
p,p'-DDD, SPLP	ug/L	0.1	U	0.1	U								
p,p'-DDD	ug/Kg					3.6	U	4.7	U				
p,p'-DDE, SPLP	ug/L	0.1	U	0.1	U								
p,p'-DDE	ug/Kg					53	J	11	=				
p,p'-DDT, SPLP	ug/L	0.1	U	0.1	U								
p,p'-DDT	ug/Kg					3.6	U	4.7	U				
Toxaphene, SPLP	ug/L	5	U	5	U								
Toxaphene	ug/Kg					190	U	240	U				

Analytical Data Summary

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Soil Pesticides

Parameter	Units	StationID		SampleID		DateCollected		DateExtracted		DateAnalyzed		SDGNumber	
		F620SB010		F620SB011		F620SB011		F620SB011		F620SB011		F620SB011	
		620SB01001a (0-1ft)		620SB01101c (0-1ft)		620SB01102a (3-5ft)		620SB01102a (3-5ft)		620SB01102a (3-5ft)		620SB01102a (3-5ft)	
		10/15/1999		10/15/1999		10/15/1999		10/15/1999		10/15/1999		10/15/1999	
		10/19/1999		10/19/1999		10/19/1999		10/19/1999		10/19/1999		10/19/1999	
		10/28/1999		10/27/1999		10/27/1999		10/27/1999		10/27/1999		10/27/1999	
		EN022		EN022		EN022		EN022		EN022		EN022	
Heptachlor	ug/Kg	2.6	U	1.9	U	1.9	U	1.9	U	1.9	U	1.9	U
Heptachlor epoxide, SPLP	ug/L												
Methoxychlor, SPLP	ug/L												
Methoxychlor	ug/Kg	26	U	19	U	19	U	19	U	19	U	19	U
p,p'-DDD, SPLP	ug/L												
p,p'-DDD	ug/Kg	5	U	3.6	U	3.7	U	3.7	U	3.7	U	3.7	U
p,p'-DDE, SPLP	ug/L												
p,p'-DDE	ug/Kg	5	U	3.6	U	3.7	U	3.7	U	3.7	U	3.7	U
p,p'-DDT, SPLP	ug/L												
p,p'-DDT	ug/Kg	5	U	3.6	U	3.7	U	3.7	U	3.7	U	3.7	U
Toxaphene, SPLP	ug/L												
Toxaphene	ug/Kg	260	U	190	U	190	U	190	U	190	U	190	U

Analytical Data Summary

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Soil SVOCs

Parameter	Units	F620SB008		F620SB008		F620SB008		F620SB008	
		StationID	SampleID	StationID	SampleID	StationID	SampleID	StationID	SampleID
		620SB008S1 (0-1ft)	620SB008S2 (3-5ft)	620SB008T1 (0-1ft)	620SB008T2 (3-5ft)	620SB008T1 (0-1ft)	620SB008T2 (3-5ft)	620SB008T1 (0-1ft)	620SB008T2 (3-5ft)
		DateCollected	DateCollected	DateCollected	DateCollected	DateCollected	DateCollected	DateCollected	DateCollected
		DateExtracted	DateExtracted	DateExtracted	DateExtracted	DateExtracted	DateExtracted	DateExtracted	DateExtracted
		DateAnalyzed	DateAnalyzed	DateAnalyzed	DateAnalyzed	DateAnalyzed	DateAnalyzed	DateAnalyzed	DateAnalyzed
		SDGNumber	SDGNumber	SDGNumber	SDGNumber	SDGNumber	SDGNumber	SDGNumber	SDGNumber
		EN022	EN023	EN022	EN023	EN022	EN023	EN022	EN023
2,2'-Oxybis(1-Chloro)propane, SPLP	ug/L	5	U	5	U				
2,2'-Oxybis(1-chloro)propane	ug/Kg					370	U	480	U
4-Methylphenol (p-Cresol), SPLP	ug/L	5	U	5	U				
4-Methylphenol (p-Cresol)	ug/Kg					370	U	480	U
N-Nitrosodiphenylamine, SPLP	ug/L	5	U	5	U				
N-Nitrosodiphenylamine	ug/Kg					370	U	480	U
Phenol, SPLP	ug/L	5	U	5	U				
Phenol	ug/Kg					370	U	480	U
bis(2-Chloroethyl) ether (2-Chloroethyl ether), S	ug/L	5	U	5	U				
bis(2-Chloroethyl) ether (2-Chloroethyl Ether)	ug/Kg					370	U	480	U
2-Chlorophenol, SPLP	ug/L	5	U	5	U				
2-Chlorophenol	ug/Kg					370	U	480	U
1,3-Dichlorobenzene, SPLP	ug/L	5	U	5	U				
1,3-Dichlorobenzene	ug/Kg					370	U	480	U
1,4-Dichlorobenzene, SPLP	ug/L	5	U	5	U				
1,4-Dichlorobenzene	ug/Kg					370	U	480	U
Benzyl alcohol, SPLP	ug/L	5	U	5	U				
Benzyl alcohol	ug/Kg					370	U	480	U
1,2-Dichlorobenzene, SPLP	ug/L	5	U	5	U				
1,2-Dichlorobenzene	ug/Kg					370	U	480	U
2-Methylphenol (o-Cresol), SPLP	ug/L	5	U	5	U				
2-Methylphenol (o-Cresol)	ug/Kg					370	U	480	U
N-Nitrosodi-n-propylamine, SPLP	ug/L	5	U	5	U				
N-Nitrosodi-n-propylamine	ug/Kg					370	U	480	U
Hexachloroethane, SPLP	ug/L	5	U	5	U				
Hexachloroethane	ug/Kg					370	U	480	U
Nitrobenzene, SPLP	ug/L	5	U	5	U				
Nitrobenzene	ug/Kg					370	U	480	U
Isophorone, SPLP	ug/L	5	U	5	U				
Isophorone	ug/Kg					370	U	480	U

Analytical Data Summary

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Soil SVOCs

Parameter	Units	F620SB012		F620SB012		F620SB013	
		620SB01201a (0-1ft)		620SB01202a (3-5ft)		620SB01301a (0-1ft)	
StationID	SampleID	10/15/1999		10/15/1999		10/15/1999	
DateCollected	DateExtracted	10/17/1999		10/17/1999		10/17/1999	
DateExtracted	DateAnalyzed	10/27/1999		10/28/1999		10/27/1999	
DateAnalyzed	SDGNumber	EN022		EN022		EN022	
2,2'-Oxybis(1-Chloro)propane, SPLP	ug/L						
2,2'-Oxybis(1-chloro)propane	ug/Kg	1500	U	1900	U	410	U
4-Methylphenol (p-Cresol), SPLP	ug/L						
4-Methylphenol (p-Cresol)	ug/Kg	1500	U	1900	U	410	U
N-Nitrosodiphenylamine, SPLP	ug/L						
N-Nitrosodiphenylamine	ug/Kg	1500	U	1900	U	410	U
Phenol, SPLP	ug/L						
Phenol	ug/Kg	1500	U	1900	U	410	U
bis(2-Chloroethyl) ether (2-Chloroethyl ether), S	ug/L						
bis(2-Chloroethyl) ether (2-Chloroethyl Ether)	ug/Kg	1500	U	1900	U	410	U
2-Chlorophenol, SPLP	ug/L						
2-Chlorophenol	ug/Kg	1500	U	1900	U	410	U
1,3-Dichlorobenzene, SPLP	ug/L						
1,3-Dichlorobenzene	ug/Kg	1500	U	1900	U	410	U
1,4-Dichlorobenzene, SPLP	ug/L						
1,4-Dichlorobenzene	ug/Kg	1500	U	1900	U	410	U
Benzyl alcohol, SPLP	ug/L						
Benzyl alcohol	ug/Kg	1500	U	1900	U	410	U
1,2-Dichlorobenzene, SPLP	ug/L						
1,2-Dichlorobenzene	ug/Kg	1500	U	1900	U	410	U
2-Methylphenol (o-Cresol), SPLP	ug/L						
2-Methylphenol (o-Cresol)	ug/Kg	1500	U	1900	U	410	U
N-Nitrosodi-n-propylamine, SPLP	ug/L						
N-Nitrosodi-n-propylamine	ug/Kg	1500	U	1900	U	410	U
Hexachloroethane, SPLP	ug/L						
Hexachloroethane	ug/Kg	1500	U	1900	U	410	U
Nitrobenzene, SPLP	ug/L						
Nitrobenzene	ug/Kg	1500	U	1900	U	410	U
Isophorone, SPLP	ug/L						
Isophorone	ug/Kg	1500	U	1900	U	410	U

Soil SVOCs

Parameter	Units	F620SB013		F620SB014		F620SB014	
		620SB01302b (3-5ft)		620SB01401a (0-1ft)		620SB01402a (3-5ft)	
StationID		10/15/1999		10/15/1999		10/15/1999	
SampleID		10/17/1999		10/17/1999		10/17/1999	
DateCollected		10/27/1999		10/27/1999		10/27/1999	
DateExtracted		EN022		EN022		EN022	
DateAnalyzed							
SDGNumber							
2,2'-Oxybis(1-Chloro)propane, SPLP	ug/L						
2,2'-Oxybis(1-chloro)propane	ug/Kg	480	U	360	U	380	U
4-Methylphenol (p-Cresol), SPLP	ug/L						
4-Methylphenol (p-Cresol)	ug/Kg	480	U	360	U	380	U
N-Nitrosodiphenylamine, SPLP	ug/L						
N-Nitrosodiphenylamine	ug/Kg	480	U	360	U	380	U
Phenol, SPLP	ug/L						
Phenol	ug/Kg	480	U	360	U	380	U
bis(2-Chloroethyl) ether (2-Chloroethyl ether), S	ug/L						
bis(2-Chloroethyl) ether (2-Chloroethyl Ether)	ug/Kg	480	U	360	U	380	U
2-Chlorophenol, SPLP	ug/L						
2-Chlorophenol	ug/Kg	480	U	360	U	380	U
1,3-Dichlorobenzene, SPLP	ug/L						
1,3-Dichlorobenzene	ug/Kg	480	U	360	U	380	U
1,4-Dichlorobenzene, SPLP	ug/L						
1,4-Dichlorobenzene	ug/Kg	480	U	360	U	380	U
Benzyl alcohol, SPLP	ug/L						
Benzyl alcohol	ug/Kg	480	U	360	U	380	U
1,2-Dichlorobenzene, SPLP	ug/L						
1,2-Dichlorobenzene	ug/Kg	480	U	360	U	380	U
2-Methylphenol (o-Cresol), SPLP	ug/L						
2-Methylphenol (o-Cresol)	ug/Kg	480	U	360	U	380	U
N-Nitrosodi-n-propylamine, SPLP	ug/L						
N-Nitrosodi-n-propylamine	ug/Kg	480	U	360	U	380	U
Hexachloroethane, SPLP	ug/L						
Hexachloroethane	ug/Kg	480	U	360	U	380	U
Nitrobenzene, SPLP	ug/L						
Nitrobenzene	ug/Kg	480	U	360	U	380	U
Isophorone, SPLP	ug/L						
Isophorone	ug/Kg	480	U	360	U	380	U

Soil SVOCs

Parameter	Units	F620SB008		F620SB008		F620SB008		F620SB008	
		620SB008S1 (0-1ft)	620SB008S2 (3-5ft)	620SB008S1 (0-1ft)	620SB008S2 (3-5ft)	620SB008T1 (0-1ft)	620SB008T2 (3-5ft)	620SB008T1 (0-1ft)	620SB008T2 (3-5ft)
StationID									
SampleID									
DateCollected		10/15/1999	10/15/1999	10/15/1999	10/15/1999	10/15/1999	10/15/1999	10/15/1999	10/15/1999
DateExtracted		10/23/1999	10/21/1999	10/17/1999	10/19/1999	10/17/1999	10/19/1999	10/17/1999	10/19/1999
DateAnalyzed		10/28/1999	10/28/1999	10/27/1999	10/29/1999	10/27/1999	10/29/1999	10/27/1999	10/29/1999
SDGNumber		EN022	EN023	EN022	EN023	EN022	EN023	EN022	EN023
2-Nitrophenol, SPLP	ug/L	5	U	5	U				
2-Nitrophenol	ug/Kg					370	U	480	U
2,4-Dimethylphenol, SPLP	ug/L	5	U	5	U				
2,4-Dimethylphenol	ug/Kg					370	U	480	U
bis(2-Chloroethoxy) methane, SPLP	ug/L	5	U	5	U				
bis(2-Chloroethoxy) Methane	ug/Kg					370	U	480	U
2,4-Dichlorophenol, SPLP	ug/L	5	U	5	U				
2,4-Dichlorophenol	ug/Kg					370	U	480	U
Benzoic acid, SPLP	ug/L	26	U	25	U				
Benzoic acid	ug/Kg					1800	U	2400	U
1,2,4-Trichlorobenzene, SPLP	ug/L	5	U	5	U				
Naphthalene, SPLP	ug/L	5	U	5	U				
Naphthalene	ug/Kg					370	U	480	U
4-Chloroaniline, SPLP	ug/L	5	U	5	U				
4-Chloroaniline	ug/Kg					370	U	480	U
Hexachlorobutadiene, SPLP	ug/L	5	U	5	U				
Hexachlorobutadiene	ug/Kg					370	U	480	U
4-Chloro-3-methylphenol, SPLP	ug/L	5	U	5	U				
4-Chloro-3-methylphenol	ug/Kg					370	U	480	U
2-Methylnaphthalene, SPLP	ug/L	5	U	5	U				
2-Methylnaphthalene	ug/Kg					370	U	480	U
Hexachlorocyclopentadiene, SPLP	ug/L	5	U	5	U				
Hexachlorocyclopentadiene	ug/Kg					370	U	480	U
2,4,6-Trichlorophenol, SPLP	ug/L	5	U	5	U				
2,4,6-Trichlorophenol	ug/Kg					370	U	480	U
2,4,5-Trichlorophenol, SPLP	ug/L	5	U	5	U				
2,4,5-Trichlorophenol	ug/Kg					370	U	480	U
2-Chloronaphthalene, SPLP	ug/L	5	U	5	U				
2-Chloronaphthalene	ug/Kg					370	U	480	U
2-Nitroaniline, SPLP	ug/L	5	U	5	U				

Soil SVOCs

StationID	F620SB012	F620SB012	F620SB013
SampleID	620SB01201a (0-1ft)	620SB01202a (3-5ft)	620SB01301a (0-1ft)
DateCollected	10/15/1999	10/15/1999	10/15/1999
DateExtracted	10/17/1999	10/17/1999	10/17/1999
DateAnalyzed	10/27/1999	10/28/1999	10/27/1999
SDGNumber	EN022	EN022	EN022
Parameter	Units		
2-Nitrophenol, SPLP	ug/L		
2-Nitrophenol	ug/Kg	1500 U	1900 U 410 U
2,4-Dimethylphenol, SPLP	ug/L		
2,4-Dimethylphenol	ug/Kg	1500 U	1900 U 410 U
bis(2-Chloroethoxy) methane, SPLP	ug/L		
bis(2-Chloroethoxy) Methane	ug/Kg	1500 U	1900 U 410 U
2,4-Dichlorophenol, SPLP	ug/L		
2,4-Dichlorophenol	ug/Kg	1500 U	1900 U 410 U
Benzoic acid, SPLP	ug/L		
Benzoic acid	ug/Kg	7600 U	9400 U 2000 U
1,2,4-Trichlorobenzene, SPLP	ug/L		
Naphthalene, SPLP	ug/L		
Naphthalene	ug/Kg	1500 U	1900 U 410 U
4-Chloroaniline, SPLP	ug/L		
4-Chloroaniline	ug/Kg	1500 U	1900 U 410 U
Hexachlorobutadiene, SPLP	ug/L		
Hexachlorobutadiene	ug/Kg	1500 U	1900 U 410 U
4-Chloro-3-methylphenol, SPLP	ug/L		
4-Chloro-3-methylphenol	ug/Kg	1500 U	1900 U 410 U
2-Methylnaphthalene, SPLP	ug/L		
2-Methylnaphthalene	ug/Kg	1500 U	1900 U 410 U
Hexachlorocyclopentadiene, SPLP	ug/L		
Hexachlorocyclopentadiene	ug/Kg	1500 U	1900 U 410 U
2,4,6-Trichlorophenol, SPLP	ug/L		
2,4,6-Trichlorophenol	ug/Kg	1500 U	1900 U 410 U
2,4,5-Trichlorophenol, SPLP	ug/L		
2,4,5-Trichlorophenol	ug/Kg	1500 U	1900 U 410 U
2-Chloronaphthalene, SPLP	ug/L		
2-Chloronaphthalene	ug/Kg	1500 U	1900 U 410 U
2-Nitroaniline, SPLP	ug/L		

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Soil SVOCs

Parameter	Units	F620SB013		F620SB014		F620SB014	
		StationID	SampleID	StationID	SampleID	StationID	SampleID
			620SB01302b (3-5ft)		620SB01401a (0-1ft)		620SB01402a (3-5ft)
		DateCollected	10/15/1999	DateCollected	10/15/1999	DateCollected	10/15/1999
		DateExtracted	10/17/1999	DateExtracted	10/17/1999	DateExtracted	10/17/1999
		DateAnalyzed	10/27/1999	DateAnalyzed	10/27/1999	DateAnalyzed	10/27/1999
		SDGNumber	EN022	SDGNumber	EN022	SDGNumber	EN022
2-Nitrophenol, SPLP	ug/L						
2-Nitrophenol	ug/Kg	480	U	360	U	380	U
2,4-Dimethylphenol, SPLP	ug/L						
2,4-Dimethylphenol	ug/Kg	480	U	360	U	380	U
bis(2-Chloroethoxy) methane, SPLP	ug/L						
bis(2-Chloroethoxy) Methane	ug/Kg	480	U	360	U	380	U
2,4-Dichlorophenol, SPLP	ug/L						
2,4-Dichlorophenol	ug/Kg	480	U	360	U	380	U
Benzoic acid, SPLP	ug/L						
Benzoic acid	ug/Kg	2400	U	1800	U	1900	U
1,2,4-Trichlorobenzene, SPLP	ug/L						
Naphthalene, SPLP	ug/L						
Naphthalene	ug/Kg	480	U	130	J	380	U
4-Chloroaniline, SPLP	ug/L						
4-Chloroaniline	ug/Kg	480	U	360	U	380	U
Hexachlorobutadiene, SPLP	ug/L						
Hexachlorobutadiene	ug/Kg	480	U	360	U	380	U
4-Chloro-3-methylphenol, SPLP	ug/L						
4-Chloro-3-methylphenol	ug/Kg	480	U	360	U	380	U
2-Methylnaphthalene, SPLP	ug/L						
2-Methylnaphthalene	ug/Kg	480	U	200	J	380	U
Hexachlorocyclopentadiene, SPLP	ug/L						
Hexachlorocyclopentadiene	ug/Kg	480	U	360	U	380	U
2,4,6-Trichlorophenol, SPLP	ug/L						
2,4,6-Trichlorophenol	ug/Kg	480	U	360	U	380	U
2,4,5-Trichlorophenol, SPLP	ug/L						
2,4,5-Trichlorophenol	ug/Kg	480	U	360	U	380	U
2-Chloronaphthalene, SPLP	ug/L						
2-Chloronaphthalene	ug/Kg	480	U	360	U	380	U
2-Nitroaniline, SPLP	ug/L						

Soil SVOCs

Parameter	Units	F620SB008		F620SB008		F620SB008		F620SB008	
		StationID	SampleID	StationID	SampleID	StationID	SampleID	StationID	SampleID
		620SB008S1 (0-1ft)	620SB008S2 (3-5ft)	620SB008T1 (0-1ft)	620SB008T2 (3-5ft)				
		DateCollected	DateCollected	DateCollected	DateCollected				
		DateExtracted	DateExtracted	DateExtracted	DateExtracted				
		DateAnalyzed	DateAnalyzed	DateAnalyzed	DateAnalyzed				
		SDGNumber	SDGNumber	SDGNumber	SDGNumber				
		EN022	EN023	EN022	EN023				
2-Nitroaniline	ug/Kg			370	U	480	U		
3-Nitroaniline, SPLP	ug/L	5	U	5	U				
3-Nitroaniline	ug/Kg			370	U	480	U		
Dimethyl phthalate, SPLP	ug/L	5	U	5	U				
Dimethyl Phthalate	ug/Kg			370	U	480	U		
2,6-Dinitrotoluene, SPLP	ug/L	5	U	5	U				
2,6-Dinitrotoluene	ug/Kg			370	U	480	U		
Acenaphthylene, SPLP	ug/L	5	U	5	U				
Acenaphthylene	ug/Kg			370	U	480	U		
Acenaphthene, SPLP	ug/L	5	U	2	J				
Acenaphthene	ug/Kg			370	U	710	=		
2,4-Dinitrophenol, SPLP	ug/L	10	U	10	U				
2,4-Dinitrophenol	ug/Kg			730	UJ	950	U		
Dibenzofuran, SPLP	ug/L	5	U	5	U				
Dibenzofuran	ug/Kg			370	U	120	J		
2,4-Dinitrotoluene, SPLP	ug/L	5	U	5	U				
2,4-Dinitrotoluene	ug/Kg			370	U	480	U		
Diethyl phthalate, SPLP	ug/L	5	U	5	U				
Diethyl Phthalate	ug/Kg			370	U	480	U		
4-Nitrophenol, SPLP	ug/L	10	U	10	U				
4-Nitrophenol	ug/Kg			730	U	950	U		
Fluorene, SPLP	ug/L	5	U	5	U				
Fluorene	ug/Kg			370	U	480	U		
4-Chlorophenyl phenyl ether, SPLP	ug/L	5	U	5	U				
4-Chlorophenyl Phenyl Ether	ug/Kg			370	U	480	U		
4,6-Dinitro-2-methylphenol, SPLP	ug/L	10	U	10	U				
4,6-Dinitro-2-methylphenol	ug/Kg			730	U	950	U		
4-Nitroaniline, SPLP	ug/L	5	U	5	U				
4-Nitroaniline	ug/Kg			370	U	480	U		
4-Bromophenyl Phenyl Ether, SPLP	ug/L	5	U	5	U				

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Soil SVOCs

Parameter	Units	F620SB012		F620SB012		F620SB013	
		620SB01201a (0-1ft)		620SB01202a (3-5ft)		620SB01301a (0-1ft)	
StationID		10/15/1999		10/15/1999		10/15/1999	
SampleID		10/17/1999		10/17/1999		10/17/1999	
DateCollected		10/27/1999		10/28/1999		10/27/1999	
DateExtracted		EN022		EN022		EN022	
DateAnalyzed							
SDGNumber							
2-Nitroaniline	ug/Kg	1500	U	1900	U	410	U
3-Nitroaniline, SPLP	ug/L						
3-Nitroaniline	ug/Kg	1500	U	1900	U	410	U
Dimethyl phthalate, SPLP	ug/L						
Dimethyl Phthalate	ug/Kg	1500	U	1900	U	410	U
2,6-Dinitrotoluene, SPLP	ug/L						
2,6-Dinitrotoluene	ug/Kg	1500	U	1900	U	410	U
Acenaphthylene, SPLP	ug/L						
Acenaphthylene	ug/Kg	1500	U	1900	U	410	U
Acenaphthene, SPLP	ug/L						
Acenaphthene	ug/Kg	1500	U	1900	U	410	U
2,4-Dinitrophenol, SPLP	ug/L						
2,4-Dinitrophenol	ug/Kg	3000	UJ	3800	U	810	UJ
Dibenzofuran, SPLP	ug/L						
Dibenzofuran	ug/Kg	1500	U	1900	U	410	U
2,4-Dinitrotoluene, SPLP	ug/L						
2,4-Dinitrotoluene	ug/Kg	1500	U	1900	U	410	U
Diethyl phthalate, SPLP	ug/L						
Diethyl Phthalate	ug/Kg	1500	U	1900	U	410	U
4-Nitrophenol, SPLP	ug/L						
4-Nitrophenol	ug/Kg	3000	U	3800	U	810	U
Fluorene, SPLP	ug/L						
Fluorene	ug/Kg	1500	U	1900	U	410	U
4-Chlorophenyl phenyl ether, SPLP	ug/L						
4-Chlorophenyl Phenyl Ether	ug/Kg	1500	U	1900	U	410	U
4,6-Dinitro-2-methylphenol, SPLP	ug/L						
4,6-Dinitro-2-methylphenol	ug/Kg	3000	U	3800	U	810	U
4-Nitroaniline, SPLP	ug/L						
4-Nitroaniline	ug/Kg	1500	U	1900	U	410	U
4-Bromophenyl Phenyl Ether, SPLP	ug/L						

Soil SVOCs

Parameter	StationID SampleID DateCollected DateExtracted DateAnalyzed SDGNumber Units	F620SB013		F620SB014		F620SB014	
		620SB01302b (3-5ft)		620SB01401a (0-1ft)		620SB01402a (3-5ft)	
2-Nitroaniline	ug/Kg	480	U	360	U	380	U
3-Nitroaniline, SPLP	ug/L						
3-Nitroaniline	ug/Kg	480	U	360	U	380	U
Dimethyl phthalate, SPLP	ug/L						
Dimethyl Phthalate	ug/Kg	480	U	360	U	380	U
2,6-Dinitrotoluene, SPLP	ug/L						
2,6-Dinitrotoluene	ug/Kg	480	U	360	U	380	U
Acenaphthylene, SPLP	ug/L						
Acenaphthylene	ug/Kg	480	U	360	U	380	U
Acenaphthene, SPLP	ug/L						
Acenaphthene	ug/Kg	480	U	360	U	380	U
2,4-Dinitrophenol, SPLP	ug/L						
2,4-Dinitrophenol	ug/Kg	970	UJ	720	UJ	760	UJ
Dibenzofuran, SPLP	ug/L						
Dibenzofuran	ug/Kg	480	U	360	U	380	U
2,4-Dinitrotoluene, SPLP	ug/L						
2,4-Dinitrotoluene	ug/Kg	480	U	360	U	380	U
Diethyl phthalate, SPLP	ug/L						
Diethyl Phthalate	ug/Kg	480	U	360	U	380	U
4-Nitrophenol, SPLP	ug/L						
4-Nitrophenol	ug/Kg	970	U	720	U	760	U
Fluorene, SPLP	ug/L						
Fluorene	ug/Kg	480	U	360	U	380	U
4-Chlorophenyl phenyl ether, SPLP	ug/L						
4-Chlorophenyl Phenyl Ether	ug/Kg	480	U	360	U	380	U
4,6-Dinitro-2-methylphenol, SPLP	ug/L						
4,6-Dinitro-2-methylphenol	ug/Kg	970	U	720	U	760	U
4-Nitroaniline, SPLP	ug/L						
4-Nitroaniline	ug/Kg	480	U	360	U	380	U
4-Bromophenyl Phenyl Ether, SPLP	ug/L						

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Soil SVOCs

Parameter	Units	F620SB008		F620SB008		F620SB008		F620SB008	
		620SB008S1 (0-1ft)	620SB008S2 (3-5ft)	620SB008T1 (0-1ft)	620SB008T2 (3-5ft)	620SB008S1 (0-1ft)	620SB008S2 (3-5ft)	620SB008T1 (0-1ft)	620SB008T2 (3-5ft)
StationID									
SampleID									
DateCollected		10/15/1999	10/15/1999	10/15/1999	10/15/1999	10/15/1999	10/15/1999	10/15/1999	10/15/1999
DateExtracted		10/23/1999	10/21/1999	10/17/1999	10/19/1999	10/23/1999	10/21/1999	10/17/1999	10/19/1999
DateAnalyzed		10/28/1999	10/28/1999	10/27/1999	10/29/1999	10/28/1999	10/28/1999	10/27/1999	10/29/1999
SDGNumber		EN022	EN023	EN022	EN023	EN022	EN023	EN022	EN023
4-Bromophenyl Phenyl Ether	ug/Kg			370	U		480	U	
Hexachlorobenzene, SPLP	ug/L	5	U	5	U				
Hexachlorobenzene	ug/Kg			370	U		480	U	
Pentachlorophenol, SPLP	ug/L	10	U	10	U				
Pentachlorophenol	ug/Kg			730	U		950	U	
Phenanthrene, SPLP	ug/L	5	U	5	U				
Phenanthrene	ug/Kg			94	J		480	U	
Anthracene, SPLP	ug/L	5	U	5	U				
Anthracene	ug/Kg			370	U		480	U	
Di-n-butyl phthalate, SPLP	ug/L	5	U	5	U				
Di-n-butyl Phthalate	ug/Kg			290	J		480	U	
Fluoranthene, SPLP	ug/L	5	U	5	U				
Fluoranthene	ug/Kg			120	J		150	J	
Pyrene, SPLP	ug/L	5	U	5	U				
Pyrene	ug/Kg			120	J		150	J	
Benzyl butyl phthalate, SPLP	ug/L	5	U	5	U				
Benzyl Butyl Phthalate	ug/Kg			370	U		480	U	
Benzo(a)anthracene, SPLP	ug/L	5	U	5	U				
Benzo(a)Anthracene	ug/Kg			78	J		480	U	
3,3'-Dichlorobenzidine, SPLP	ug/L	10	U	10	U				
3,3'-Dichlorobenzidine	ug/Kg			730	U		950	U	
Chrysene, SPLP	ug/L	5	U	5	U				
Chrysene	ug/Kg			110	J		95	J	
bis(2-Ethylhexyl) phthalate, SPLP	ug/L	5	U	5	U				
bis(2-Ethylhexyl) Phthalate	ug/Kg			370	U		480	U	
Di-n-octylphthalate, SPLP	ug/L	5	U	5	U				
Di-n-octylphthalate	ug/Kg			370	U		480	U	
Benzo(b)fluoranthene, SPLP	ug/L	5	U	5	U				
Benzo(b)Fluoranthene	ug/Kg			190	J		120	J	
Benzo(k)fluoranthene, SPLP	ug/L	5	U	5	U				

Analytic Data Summary

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Soil SVOCs

Parameter	StationID SampleID DateCollected DateExtracted DateAnalyzed SDGNumber Units	F620SB012		F620SB012		F620SB013	
		620SB01201a (0-1ft)		620SB01202a (3-5ft)		620SB01301a (0-1ft)	
4-Bromophenyl Phenyl Ether	ug/Kg	1500	U	1900	U	410	U
Hexachlorobenzene, SPLP	ug/L						
Hexachlorobenzene	ug/Kg	1500	U	1900	U	410	U
Pentachlorophenol, SPLP	ug/L						
Pentachlorophenol	ug/Kg	3000	U	3800	U	810	U
Phenanthrene, SPLP	ug/L						
Phenanthrene	ug/Kg	1500	U	1900	U	410	U
Anthracene, SPLP	ug/L						
Anthracene	ug/Kg	1500	U	1900	U	410	U
Di-n-butyl phthalate, SPLP	ug/L						
Di-n-butyl Phthalate	ug/Kg	1500	U	1900	U	410	U
Fluoranthene, SPLP	ug/L						
Fluoranthene	ug/Kg	1500	U	1900	U	160	J
Pyrene, SPLP	ug/L						
Pyrene	ug/Kg	1500	U	1900	U	200	J
Benzyl butyl phthalate, SPLP	ug/L						
Benzyl Butyl Phthalate	ug/Kg	1500	U	1900	U	410	U
Benzo(a)anthracene, SPLP	ug/L						
Benzo(a)Anthracene	ug/Kg	1500	U	1900	U	99	J
3,3'-Dichlorobenzidine, SPLP	ug/L						
3,3'-Dichlorobenzidine	ug/Kg	3000	U	3800	U	810	U
Chrysene, SPLP	ug/L						
Chrysene	ug/Kg	1500	U	1900	U	130	J
bis(2-Ethylhexyl) phthalate, SPLP	ug/L						
bis(2-Ethylhexyl) Phthalate	ug/Kg	1500	U	1900	U	410	U
Di-n-octylphthalate, SPLP	ug/L						
Di-n-octylphthalate	ug/Kg	1500	U	1900	U	410	U
Benzo(b)fluoranthene, SPLP	ug/L						
Benzo(b)Fluoranthene	ug/Kg	1500	U	1900	U	160	J
Benzo(k)fluoranthene, SPLP	ug/L						

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Soil SVOCs

Parameter	Units	F620SB013		F620SB014		F620SB014	
		620SB01302b (3-5ft)		620SB01401a (0-1ft)		620SB01402a (3-5ft)	
StationID		10/15/1999		10/15/1999		10/15/1999	
SampleID		10/17/1999		10/17/1999		10/17/1999	
DateCollected		10/27/1999		10/27/1999		10/27/1999	
DateExtracted		EN022		EN022		EN022	
DateAnalyzed							
SDGNumber							
4-Bromophenyl Phenyl Ether	ug/Kg	480	U	360	U	380	U
Hexachlorobenzene, SPLP	ug/L						
Hexachlorobenzene	ug/Kg	480	U	360	U	380	U
Pentachlorophenol, SPLP	ug/L						
Pentachlorophenol	ug/Kg	970	U	720	U	760	U
Phenanthrene, SPLP	ug/L						
Phenanthrene	ug/Kg	110	J	89	J	380	U
Anthracene, SPLP	ug/L						
Anthracene	ug/Kg	480	U	360	U	380	U
Di-n-butyl phthalate, SPLP	ug/L						
Di-n-butyl Phthalate	ug/Kg	480	U	360	U	380	U
Fluoranthene, SPLP	ug/L						
Fluoranthene	ug/Kg	360	J	360	U	380	U
Pyrene, SPLP	ug/L						
Pyrene	ug/Kg	350	J	360	U	380	U
Benzyl butyl phthalate, SPLP	ug/L						
Benzyl Butyl Phthalate	ug/Kg	480	U	360	U	380	U
Benzo(a)anthracene, SPLP	ug/L						
Benzo(a)Anthracene	ug/Kg	150	J	360	U	380	U
3,3'-Dichlorobenzidine, SPLP	ug/L						
3,3'-Dichlorobenzidine	ug/Kg	970	U	720	U	760	U
Chrysene, SPLP	ug/L						
Chrysene	ug/Kg	210	J	360	U	380	U
bis(2-Ethylhexyl) phthalate, SPLP	ug/L						
bis(2-Ethylhexyl) Phthalate	ug/Kg	480	U	120	J	380	U
Di-n-octylphthalate, SPLP	ug/L						
Di-n-octylphthalate	ug/Kg	480	U	1100	=	380	U
Benzo(b)fluoranthene, SPLP	ug/L						
Benzo(b)Fluoranthene	ug/Kg	220	J	360	U	92	J
Benzo(k)fluoranthene, SPLP	ug/L						

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Soil SVOCs

Parameter	Units	StationID		SampleID		DateCollected		DateExtracted		DateAnalyzed		SDGNumber	
		F620SB008		F620SB008		F620SB008		F620SB008		F620SB008		F620SB008	
		620SB008S1 (0-1ft)		620SB008S2 (3-5ft)		620SB008T1 (0-1ft)		620SB008T2 (3-5ft)					
Benzo(k)Fluoranthene	ug/Kg	10/15/1999		10/15/1999		10/15/1999		10/15/1999		10/15/1999		10/15/1999	
Benzo(a)pyrene, SPLP	ug/L	10/23/1999		10/21/1999		10/17/1999		10/19/1999		10/29/1999		10/29/1999	
Benzo(a)Pyrene	ug/Kg	10/28/1999		10/28/1999		10/27/1999		10/29/1999		10/29/1999		10/29/1999	
Indeno(1,2,3-c,d)pyrene, SPLP	ug/L	EN022		EN023		EN022		EN023		EN022		EN023	
Indeno(1,2,3-c,d)pyrene	ug/Kg												
Dibenz(a,h)anthracene, SPLP	ug/L	5		U		5		U		130		J	
Dibenz(a,h)anthracene	ug/Kg									120		J	
Benzo(g,h,i)perylene, SPLP	ug/L	5		U		5		U				100	
Benzo(g,h,i)Perylene	ug/Kg									140		J	
		5		U		5		U				480	
										370		U	
		5		U		5		U				480	
										130		J	
												480	
												U	

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Soil SVOCs

Parameter	Units	F620SB012		F620SB012		F620SB013	
		StationID	SampleID	StationID	SampleID	StationID	SampleID
			620SB01201a (0-1ft)		620SB01202a (3-5ft)		620SB01301a (0-1ft)
		DateCollected	10/15/1999	DateCollected	10/15/1999	DateCollected	10/15/1999
		DateExtracted	10/17/1999	DateExtracted	10/17/1999	DateExtracted	10/17/1999
		DateAnalyzed	10/27/1999	DateAnalyzed	10/28/1999	DateAnalyzed	10/27/1999
		SDGNumber	EN022	SDGNumber	EN022	SDGNumber	EN022
Benzo(k)Fluoranthene	ug/Kg		1500 U		1900 U		140 J
Benzo(a)pyrene, SPLP	ug/L						
Benzo(a)Pyrene	ug/Kg		1500 U		1900 U		120 J
Indeno(1,2,3-c,d)pyrene, SPLP	ug/L						
Indeno(1,2,3-c,d)pyrene	ug/Kg		1500 U		1900 U		410 U
Dibenz(a,h)anthracene, SPLP	ug/L						
Dibenz(a,h)anthracene	ug/Kg		1500 U		1900 U		410 U
Benzo(g,h,i)perylene, SPLP	ug/L						
Benzo(g,h,i)Perylene	ug/Kg		1500 U		1900 U		410 U

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Soil SVOCs

Parameter	Units	F620SB013		F620SB014		F620SB014	
		StationID	SampleID	StationID	SampleID	StationID	SampleID
			620SB01302b (3-5ft)		620SB01401a (0-1ft)		620SB01402a (3-5ft)
		DateCollected	10/15/1999	DateCollected	10/15/1999	DateCollected	10/15/1999
		DateExtracted	10/17/1999	DateExtracted	10/17/1999	DateExtracted	10/17/1999
		DateAnalyzed	10/27/1999	DateAnalyzed	10/27/1999	DateAnalyzed	10/27/1999
		SDGNumber	EN022	SDGNumber	EN022	SDGNumber	EN022
Benzo(k)Fluoranthene	ug/Kg	180	J	360	U	380	U
Benzo(a)pyrene, SPLP	ug/L						
Benzo(a)Pyrene	ug/Kg	160	J	360	U	380	U
Indeno(1,2,3-c,d)pyrene, SPLP	ug/L						
Indeno(1,2,3-c,d)pyrene	ug/Kg	110	J	360	U	380	U
Dibenz(a,h)anthracene, SPLP	ug/L						
Dibenz(a,h)anthracene	ug/Kg	480	U	360	U	380	U
Benzo(g,h,i)perylene, SPLP	ug/L						
Benzo(g,h,i)Perylene	ug/Kg	480	U	360	U	380	U

Soil VOCs

Parameter	Units	F620SB008		F620SB008		F620SB008		F620SB008	
		620SB008S1 (0-1ft)		620SB008S2 (3-5ft)		620SB008T1 (0-1ft)		620SB008T1 (0-1ft)	
		DateCollected		DateCollected		DateCollected		DateCollected	
		DateExtracted		DateExtracted		DateExtracted		DateExtracted	
		SDGNumber		SDGNumber		SDGNumber		SDGNumber	
Benzene, SPLP	ug/L	60	U	60	U				
1,2,4-Trichlorobenzene	ug/Kg					370	U		
Chloromethane, SPLP	ug/L	60	U	60	U				
Chloromethane	ug/Kg							3	U
Vinyl Chloride, SPLP	ug/L	60	U	60	U				
Vinyl chloride	ug/Kg							3	U
Bromomethane, SPLP	ug/L	60	U	60	U				
Bromomethane	ug/Kg							3	U
Chloroethane, SPLP	ug/L	60	U	60	U				
Chloroethane	ug/Kg							3	U
1,1-Dichloroethene, SPLP	ug/L	60	U	60	U				
1,1-Dichloroethene	ug/Kg							3	U
Acetone, SPLP	ug/L	100	R	100	R				
Acetone	ug/Kg							29	U
Carbon Disulfide, SPLP	ug/L	60	U	60	U				
Carbon Disulfide	ug/Kg							3	U
Methylene Chloride, SPLP	ug/L	30	J	37	J				
Methylene Chloride	ug/Kg							21	U
1,1-Dichloroethane, SPLP	ug/L	60	U	60	U				
1,1-Dichloroethane	ug/Kg							3	U
Vinyl acetate, SPLP	ug/L	60	U	60	U				
Vinyl acetate	ug/Kg							3	U
Methyl ethyl ketone (2-Butanone), SPLP	ug/L	100	U	100	U				
Methyl ethyl ketone (2-Butanone)	ug/Kg							6	U
1,2-Dichloroethene (total), SPLP	ug/L	60	U	60	U				
1,2-Dichloroethene (total)	ug/Kg							3	U
Chloroform, SPLP	ug/L	60	U	60	U				
Chloroform	ug/Kg							3	U
1,1,1-Trichloroethane, SPLP	ug/L	60	U	60	U				
1,1,1-Trichloroethane	ug/Kg							3	U

Soil VOCs

StationID	F620SB008	F620SB008	F620SB008	F620SB008
SampleID	620SB008T1RE (0-1ft)	620SB008T2 (3-5ft)	620SB008T2 (3-5ft)	620SB008T2RE (3-5ft)
DateCollected	10/15/1999	10/15/1999	10/15/1999	10/15/1999
DateExtracted	10/21/1999	10/19/1999	10/19/1999	10/21/1999
DateAnalyzed	10/21/1999	10/19/1999	10/29/1999	10/21/1999
SDGNumber	EN022	EN023	EN023	EN023
Parameter	Units			
Benzene, SPLP	ug/L			
1,2,4-Trichlorobenzene	ug/Kg			
Chloromethane, SPLP	ug/L		480 U	
Chloromethane	ug/Kg	3 R	4 U	5 R
Vinyl Chloride, SPLP	ug/L			
Vinyl chloride	ug/Kg	3 R	4 U	5 R
Bromomethane, SPLP	ug/L			
Bromomethane	ug/Kg	3 R	4 U	5 R
Chloroethane, SPLP	ug/L			
Chloroethane	ug/Kg	3 R	4 U	5 R
1,1-Dichloroethene, SPLP	ug/L			
1,1-Dichloroethene	ug/Kg	3 R	4 U	5 R
Acetone, SPLP	ug/L			
Acetone	ug/Kg	7 R	40 U	42 R
Carbon Disulfide, SPLP	ug/L			
Carbon Disulfide	ug/Kg	3 R	4 J	3 R
Methylene Chloride, SPLP	ug/L			
Methylene Chloride	ug/Kg	17 R	11 U	9 R
1,1-Dichloroethane, SPLP	ug/L			
1,1-Dichloroethane	ug/Kg	3 R	4 U	5 R
Vinyl acetate, SPLP	ug/L			
Vinyl acetate	ug/Kg	3 R	4 U	6 R
Methyl ethyl ketone (2-Butanone), SPLP	ug/L			
Methyl ethyl ketone (2-Butanone)	ug/Kg	5 R	2 J	8 R
1,2-Dichloroethene (total), SPLP	ug/L			
1,2-Dichloroethene (total)	ug/Kg	3 R	4 U	5 R
Chloroform, SPLP	ug/L			
Chloroform	ug/Kg	3 R	4 U	5 R
1,1,1-Trichloroethane, SPLP	ug/L			
1,1,1-Trichloroethane	ug/Kg	3 R	4 U	5 R

Soil VOCs

Parameter	Units	F620SB012		F620SB012		F620SB013	
		StationID	SampleID	StationID	SampleID	StationID	SampleID
			620SB01201a (0-1ft)		620SB01202a (3-5ft)		620SB01301a (0-1ft)
		DateCollected	10/15/1999	DateCollected	10/15/1999	DateCollected	10/15/1999
		DateExtracted	10/17/1999	DateExtracted	10/17/1999	DateExtracted	10/17/1999
		DateAnalyzed	10/27/1999	DateAnalyzed	10/28/1999	DateAnalyzed	10/27/1999
		SDGNumber	EN022	SDGNumber	EN022	SDGNumber	EN022
Benzene, SPLP	ug/L						
1,2,4-Trichlorobenzene	ug/Kg	1500	U	1900	U	410	U
Chloromethane, SPLP	ug/L						
Chloromethane	ug/Kg						
Vinyl Chloride, SPLP	ug/L						
Vinyl chloride	ug/Kg						
Bromomethane, SPLP	ug/L						
Bromomethane	ug/Kg						
Chloroethane, SPLP	ug/L						
Chloroethane	ug/Kg						
1,1-Dichloroethene, SPLP	ug/L						
1,1-Dichloroethene	ug/Kg						
Acetone, SPLP	ug/L						
Acetone	ug/Kg						
Carbon Disulfide, SPLP	ug/L						
Carbon Disulfide	ug/Kg						
Methylene Chloride, SPLP	ug/L						
Methylene Chloride	ug/Kg						
1,1-Dichloroethane, SPLP	ug/L						
1,1-Dichloroethane	ug/Kg						
Vinyl acetate, SPLP	ug/L						
Vinyl acetate	ug/Kg						
Methyl ethyl ketone (2-Butanone), SPLP	ug/L						
Methyl ethyl ketone (2-Butanone)	ug/Kg						
1,2-Dichloroethene (total), SPLP	ug/L						
1,2-Dichloroethene (total)	ug/Kg						
Chloroform, SPLP	ug/L						
Chloroform	ug/Kg						
1,1,1-Trichloroethane, SPLP	ug/L						
1,1,1-Trichloroethane	ug/Kg						

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Soil VOCs

StationID	F620SB013	F620SB014	F620SB014
SampleID	620SB01302b (3-5ft)	620SB01401a (0-1ft)	620SB01402a (3-5ft)
DateCollected	10/15/1999	10/15/1999	10/15/1999
DateExtracted	10/17/1999	10/17/1999	10/17/1999
DateAnalyzed	10/27/1999	10/27/1999	10/27/1999
SDGNumber	EN022	EN022	EN022
Parameter	Units		
Benzene, SPLP	ug/L		
1,2,4-Trichlorobenzene	ug/Kg	480 U	360 U
Chloromethane, SPLP	ug/L		
Chloromethane	ug/Kg		
Vinyl Chloride, SPLP	ug/L		
Vinyl chloride	ug/Kg		
Bromomethane, SPLP	ug/L		
Bromomethane	ug/Kg		
Chloroethane, SPLP	ug/L		
Chloroethane	ug/Kg		
1,1-Dichloroethene, SPLP	ug/L		
1,1-Dichloroethene	ug/Kg		
Acetone, SPLP	ug/L		
Acetone	ug/Kg		
Carbon Disulfide, SPLP	ug/L		
Carbon Disulfide	ug/Kg		
Methylene Chloride, SPLP	ug/L		
Methylene Chloride	ug/Kg		
1,1-Dichloroethane, SPLP	ug/L		
1,1-Dichloroethane	ug/Kg		
Vinyl acetate, SPLP	ug/L		
Vinyl acetate	ug/Kg		
Methyl ethyl ketone (2-Butanone), SPLP	ug/L		
Methyl ethyl ketone (2-Butanone)	ug/Kg		
1,2-Dichloroethene (total), SPLP	ug/L		
1,2-Dichloroethene (total)	ug/Kg		
Chloroform, SPLP	ug/L		
Chloroform	ug/Kg		
1,1,1-Trichloroethane, SPLP	ug/L		
1,1,1-Trichloroethane	ug/Kg		

Soil VOCs

Parameter	Units	F620SB008		F620SB008		F620SB008		F620SB008	
		620SB008S1 (0-1ft)		620SB008S2 (3-5ft)		620SB008T1 (0-1ft)		620SB008T1 (0-1ft)	
StationID									
SampleID									
DateCollected		10/15/1999		10/15/1999		10/15/1999		10/15/1999	
DateExtracted		10/21/1999		10/21/1999		10/17/1999		10/19/1999	
DateAnalyzed		10/21/1999		10/21/1999		10/27/1999		10/19/1999	
SDGNumber		EN022		EN023		EN022		EN022	
Carbon Tetrachloride, SPLP	ug/L	60	U	60	U				
Carbon Tetrachloride	ug/Kg							3	U
1,2-Dichloroethane, SPLP	ug/L	60	U	60	U				
1,2-Dichloroethane	ug/Kg							3	U
Benzene	ug/Kg							3	U
Trichloroethylene (TCE), SPLP	ug/L	60	U	60	U				
Trichloroethylene (TCE)	ug/Kg							3	U
1,2-Dichloropropane, SPLP	ug/L	60	U	60	U				
1,2-Dichloropropane	ug/Kg							3	U
Bromodichloromethane, SPLP	ug/L	60	U	60	U				
Bromodichloromethane	ug/Kg							3	U
2-Chloroethyl vinyl ether, SPLP	ug/L	200	U	200	U				
2-Chloroethyl vinyl ether	ug/Kg							11	U
cis-1,3-Dichloropropene, SPLP	ug/L	60	U	60	U				
cis-1,3-Dichloropropene	ug/Kg							3	U
Methyl Isobutyl ketone (4-Methyl-2-pentanone), SPLP	ug/L	100	U	100	U				
Methyl isobutyl ketone (4-Methyl-2-pentanone)	ug/Kg							6	U
Toluene, SPLP	ug/L	60	U	60	U				
Toluene	ug/Kg							4	=
trans-1,3-Dichloropropene	ug/Kg							3	U
trans-1,3-Dichloropropene, SPLP	ug/L	60	U	60	U				
1,1,2-Trichloroethane, SPLP	ug/L	60	U	60	U				
1,1,2-Trichloroethane	ug/Kg							3	U
2-Hexanone, SPLP	ug/L	100	U	100	U				
2-Hexanone	ug/Kg							6	U
Tetrachloroethylene (PCE)	ug/Kg							3	U
Tetrachloroethylene(PCE), SPLP	ug/L	60	U	60	U				
Dibromochloromethane, SPLP	ug/L	60	U	60	U				
Dibromochloromethane	ug/Kg							3	U
Chlorobenzene, SPLP	ug/L	60	U	60	U				

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Soil VOCs

StationID	F620SB008	F620SB008	F620SB008	F620SB008
SampleID	620SB008T1RE (0-1ft)	620SB008T2 (3-5ft)	620SB008T2 (3-5ft)	620SB008T2RE (3-5ft)
DateCollected	10/15/1999	10/15/1999	10/15/1999	10/15/1999
DateExtracted	10/21/1999	10/19/1999	10/19/1999	10/21/1999
DateAnalyzed	10/21/1999	10/19/1999	10/29/1999	10/21/1999
SDGNumber	EN022	EN023	EN023	EN023
Parameter	Units			
Carbon Tetrachloride, SPLP	ug/L			
Carbon Tetrachloride	ug/Kg	3 R	4 U	5 R
1,2-Dichloroethane, SPLP	ug/L			
1,2-Dichloroethane	ug/Kg	3 R	4 U	5 R
Benzene	ug/Kg	3 R	4 U	5 R
Trichloroethylene (TCE), SPLP	ug/L			
Trichloroethylene (TCE)	ug/Kg	3 R	4 U	5 R
1,2-Dichloropropane, SPLP	ug/L			
1,2-Dichloropropane	ug/Kg	3 R	4 U	5 R
Bromodichloromethane, SPLP	ug/L			
Bromodichloromethane	ug/Kg	3 R	4 U	5 R
2-Chloroethyl vinyl ether, SPLP	ug/L			
2-Chloroethyl vinyl ether	ug/Kg	10 R	14 U	20 R
cis-1,3-Dichloropropene, SPLP	ug/L			
cis-1,3-Dichloropropene	ug/Kg	3 R	4 U	5 R
Methyl Isobutyl ketone (4-Methyl-2-pentanone), SPLP	ug/L			
Methyl isobutyl ketone (4-Methyl-2-pentanone)	ug/Kg	5 R	7 U	8 R
Toluene, SPLP	ug/L			
Toluene	ug/Kg	1 R	4 U	5 R
trans-1,3-Dichloropropene	ug/Kg	3 R	4 U	5 R
trans-1,3-Dichloropropene, SPLP	ug/L			
1,1,2-Trichloroethane, SPLP	ug/L			
1,1,2-Trichloroethane	ug/Kg	3 R	4 U	5 R
2-Hexanone, SPLP	ug/L			
2-Hexanone	ug/Kg	5 R	7 U	8 R
Tetrachloroethylene (PCE)	ug/Kg	3 R	4 U	5 R
Tetrachloroethylene(PCE), SPLP	ug/L			
Dibromochloromethane, SPLP	ug/L			
Dibromochloromethane	ug/Kg	3 R	4 U	5 R
Chlorobenzene, SPLP	ug/L			

Soil VOCs

Parameter	Units	StationID	F620SB012	F620SB012	F620SB013
		SampleID	620SB01201a (0-1ft)	620SB01202a (3-5ft)	620SB01301a (0-1ft)
		DateCollected	10/15/1999	10/15/1999	10/15/1999
		DateExtracted	10/17/1999	10/17/1999	10/17/1999
		DateAnalyzed	10/27/1999	10/28/1999	10/27/1999
		SDGNumber	EN022	EN022	EN022
Carbon Tetrachloride, SPLP	ug/L				
Carbon Tetrachloride	ug/Kg				
1,2-Dichloroethane, SPLP	ug/L				
1,2-Dichloroethane	ug/Kg				
Benzene	ug/Kg				
Trichloroethylene (TCE), SPLP	ug/L				
Trichloroethylene (TCE)	ug/Kg				
1,2-Dichloropropane, SPLP	ug/L				
1,2-Dichloropropane	ug/Kg				
Bromodichloromethane, SPLP	ug/L				
Bromodichloromethane	ug/Kg				
2-Chloroethyl vinyl ether, SPLP	ug/L				
2-Chloroethyl vinyl ether	ug/Kg				
cis-1,3-Dichloropropene, SPLP	ug/L				
cis-1,3-Dichloropropene	ug/Kg				
Methyl Isobutyl ketone (4-Methyl-2-pentanone), SPLP	ug/L				
Methyl isobutyl ketone (4-Methyl-2-pentanone)	ug/Kg				
Toluene, SPLP	ug/L				
Toluene	ug/Kg				
trans-1,3-Dichloropropene	ug/Kg				
trans-1,3-Dichloropropene, SPLP	ug/L				
1,1,2-Trichloroethane, SPLP	ug/L				
1,1,2-Trichloroethane	ug/Kg				
2-Hexanone, SPLP	ug/L				
2-Hexanone	ug/Kg				
Tetrachloroethylene (PCE)	ug/Kg				
Tetrachloroethylene(PCE), SPLP	ug/L				
Dibromochloromethane, SPLP	ug/L				
Dibromochloromethane	ug/Kg				
Chlorobenzene, SPLP	ug/L				

Soil VOCs

Parameter	Units	StationID	F620SB013	F620SB014	F620SB014
		SampleID	620SB01302b (3-5ft)	620SB01401a (0-1ft)	620SB01402a (3-5ft)
		DateCollected	10/15/1999	10/15/1999	10/15/1999
		DateExtracted	10/17/1999	10/17/1999	10/17/1999
		DateAnalyzed	10/27/1999	10/27/1999	10/27/1999
		SDGNumber	EN022	EN022	EN022
Carbon Tetrachloride, SPLP	ug/L				
Carbon Tetrachloride	ug/Kg				
1,2-Dichloroethane, SPLP	ug/L				
1,2-Dichloroethane	ug/Kg				
Benzene	ug/Kg				
Trichloroethylene (TCE), SPLP	ug/L				
Trichloroethylene (TCE)	ug/Kg				
1,2-Dichloropropane, SPLP	ug/L				
1,2-Dichloropropane	ug/Kg				
Bromodichloromethane, SPLP	ug/L				
Bromodichloromethane	ug/Kg				
2-Chloroethyl vinyl ether, SPLP	ug/L				
2-Chloroethyl vinyl ether	ug/Kg				
cis-1,3-Dichloropropene, SPLP	ug/L				
cis-1,3-Dichloropropene	ug/Kg				
Methyl Isobutyl ketone (4-Methyl-2-pentanone), SPLP	ug/L				
Methyl isobutyl ketone (4-Methyl-2-pentanone)	ug/Kg				
Toluene, SPLP	ug/L				
Toluene	ug/Kg				
trans-1,3-Dichloropropene	ug/Kg				
trans-1,3-Dichloropropene, SPLP	ug/L				
1,1,2-Trichloroethane, SPLP	ug/L				
1,1,2-Trichloroethane	ug/Kg				
2-Hexanone, SPLP	ug/L				
2-Hexanone	ug/Kg				
Tetrachloroethylene (PCE)	ug/Kg				
Tetrachloroethylene(PCE), SPLP	ug/L				
Dibromochloromethane, SPLP	ug/L				
Dibromochloromethane	ug/Kg				
Chlorobenzene, SPLP	ug/L				

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Soil VOCs

Parameter	StationID	F620SB008		F620SB008		F620SB008		F620SB008	
	SampleID	620SB008S1 (0-1ft)		620SB008S2 (3-5ft)		620SB008T1 (0-1ft)		620SB008T1 (0-1ft)	
	DateCollected	10/15/1999		10/15/1999		10/15/1999		10/15/1999	
	DateExtracted	10/21/1999		10/21/1999		10/17/1999		10/19/1999	
	DateAnalyzed	10/21/1999		10/21/1999		10/27/1999		10/19/1999	
	SDGNumber	EN022		EN023		EN022		EN022	
	Units								
Chlorobenzene	ug/Kg							3	U
Ethylbenzene, SPLP	ug/L	60	U	60	U				
Ethylbenzene	ug/Kg							3	U
Xylenes, Total, SPLP	ug/L	60	U	60	U				
Xylenes, Total	ug/Kg							3	U
Styrene, SPLP	ug/L	60	U	60	U				
Styrene	ug/Kg							3	U
Bromoform, SPLP	ug/L	60	U	60	U				
Bromoform	ug/Kg							3	U
1,1,2,2-Tetrachloroethane, SPLP	ug/L	60	U	60	U				
1,1,2,2-Tetrachloroethane	ug/Kg							3	U

Soil VOCs

Parameter	Units	F620SB008		F620SB008		F620SB008		F620SB008	
		StationID	SampleID	StationID	SampleID	StationID	SampleID	StationID	SampleID
		620SB008T1RE (0-1ft)	620SB008T2 (3-5ft)	620SB008T2 (3-5ft)	620SB008T2 (3-5ft)	620SB008T2 (3-5ft)	620SB008T2 (3-5ft)	620SB008T2RE (3-5ft)	620SB008T2RE (3-5ft)
		DateCollected	10/15/1999	10/15/1999	10/15/1999	10/15/1999	10/15/1999	10/15/1999	10/15/1999
		DateExtracted	10/21/1999	10/19/1999	10/19/1999	10/19/1999	10/19/1999	10/21/1999	10/21/1999
		DateAnalyzed	10/21/1999	10/19/1999	10/29/1999	10/29/1999	10/29/1999	10/21/1999	10/21/1999
		SDGNumber	EN022	EN023	EN023	EN023	EN023	EN023	EN023
Chlorobenzene	ug/Kg	3	R	4	U			5	R
Ethylbenzene, SPLP	ug/L								
Ethylbenzene	ug/Kg	3	R	4	U			5	R
Xylenes, Total, SPLP	ug/L								
Xylenes, Total	ug/Kg	3	R	4	U			5	R
Styrene, SPLP	ug/L								
Styrene	ug/Kg	3	R	4	U			5	R
Bromoform, SPLP	ug/L								
Bromoform	ug/Kg	3	R	4	U			5	R
1,1,2,2-Tetrachloroethane, SPLP	ug/L								
1,1,2,2-Tetrachloroethane	ug/Kg	3	R	4	UJ			5	R

Soil VOCs

Parameter	Units	StationID	F620SB012	F620SB012	F620SB013
		SampleID	620SB01201a (0-1ft)	620SB01202a (3-5ft)	620SB01301a (0-1ft)
		DateCollected	10/15/1999	10/15/1999	10/15/1999
		DateExtracted	10/17/1999	10/17/1999	10/17/1999
		DateAnalyzed	10/27/1999	10/28/1999	10/27/1999
		SDGNumber	EN022	EN022	EN022
Chlorobenzene	ug/Kg				
Ethylbenzene, SPLP	ug/L				
Ethylbenzene	ug/Kg				
Xylenes, Total, SPLP	ug/L				
Xylenes, Total	ug/Kg				
Styrene, SPLP	ug/L				
Styrene	ug/Kg				
Bromoform, SPLP	ug/L				
Bromoform	ug/Kg				
1,1,2,2-Tetrachloroethane, SPLP	ug/L				
1,1,2,2-Tetrachloroethane	ug/Kg				

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Soil VOCs

StationID	F620SB013	F620SB014	F620SB014
SampleID	620SB01302b (3-5ft)	620SB01401a (0-1ft)	620SB01402a (3-5ft)
DateCollected	10/15/1999	10/15/1999	10/15/1999
DateExtracted	10/17/1999	10/17/1999	10/17/1999
DateAnalyzed	10/27/1999	10/27/1999	10/27/1999
SDGNumber	EN022	EN022	EN022
Parameter	Units		
Chlorobenzene	ug/Kg		
Ethylbenzene, SPLP	ug/L		
Ethylbenzene	ug/Kg		
Xylenes, Total, SPLP	ug/L		
Xylenes, Total	ug/Kg		
Styrene, SPLP	ug/L		
Styrene	ug/Kg		
Bromoform, SPLP	ug/L		
Bromoform	ug/Kg		
1,1,2,2-Tetrachloroethane, SPLP	ug/L		
1,1,2,2-Tetrachloroethane	ug/Kg		

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Groundwater Metals		StationID	F620GW001		F620GW002		F620GW003		F620GW003		
		SampleID	620GW00104		620GW00204		620GW003A3		620GW003A4		
		DateCollected	11/19/1997		11/17/1997		11/17/1997		2/11/1998		
		DateExtracted	12/4/1997		11/29/1997		11/29/1997		2/18/1998		
		DateAnalyzed	12/8/1997		12/11/1997		12/11/1997		2/20/1998		
		SDGNumber	31911		31821		31821		32688		
Parameter	Units										
Tin (Sn)	ug/L	14	U	14	U	14	U	14	U		
Aluminum	ug/L	834	=	8	U	67	U	137	=		
Antimony	ug/L	1.9	J	2.2	U	3.4	U	1.6	U		
Arsenic	ug/L	6.3	J	3.8	J	6.7	J	2.1	U		
Barium	ug/L	317	J	28.7	=	57.4	=	1770	J		
Beryllium	ug/L	0.2	U	0.2	U	0.2	U	0.2	U		
Cadmium	ug/L	0.3	U	0.3	U	0.3	U	0.3	U		
Calcium	ug/L	95600	=	129000	=	125000	=	51400	=		
Chromium, Total	ug/L	8	J	4.3	J	16	=	1	U		
Cobalt	ug/L	1.1	J	0.8	U	0.8	U	0.8	U		
Copper	ug/L	5.3	U	1.4	U	1.7	U	4.2	J		
Iron	ug/L	3710	J	1730	=	11200	=	163	U		
Lead	ug/L	4.1	U	1.8	U	1.5	U	3	J		
Magnesium	ug/L	213000	=	5790	=	17200	=	4250	=		
Manganese	ug/L	186	=	184	=	554	=	3.5	U		
Nickel	ug/L	4.3	J	0.93	U	28.2	J	1.5	J		
Potassium	ug/L	25500	=	8370	=	14900	=	52700	=		
Selenium	ug/L	3.4	U	3.4	U	3.4	U	3.4	U		
Silver	ug/L	1	U	1	U	1	U	1	U		
Sodium	ug/L	611000	=	16500	U	55100	U	50500	U		
Thallium	ug/L	5	U	5	U	5	U	5	U		
Vanadium	ug/L	18.8	J	1.1	U	1.3	J	1.1	U		
Zinc	ug/L	33.2	U	5.8	U	6.2	U	26.2	U		
Mercury	ug/L	0.1	U	0.1	U	0.1	U	0.1	U		

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Groundwater Metals		StationID	F620GW004		F620GW004		F620GW004	
		SampleID	620GW004A3		620GW004A4		620HW004A4	
		DateCollected	11/19/1997		2/11/1998		2/11/1998	
		DateExtracted	12/4/1997		2/18/1998		2/18/1998	
		DateAnalyzed	12/8/1997		2/20/1998		2/20/1998	
		SDGNumber	31911		32688		32688	
Parameter	Units							
Tin (Sn)	ug/L	14	U	14	U	14	U	
Aluminum	ug/L	398	=	293	=	467	=	
Antimony	ug/L	3.8	J	1.9	U	2.5	U	
Arsenic	ug/L	8.3	J	8.7	U	6.9	U	
Barium	ug/L	37.2	J	20.2	J	16.7	J	
Beryllium	ug/L	0.2	U	0.2	U	0.2	U	
Cadmium	ug/L	0.97	J	0.3	U	0.3	U	
Calcium	ug/L	74600	=	59700	=	58400	=	
Chromium, Total	ug/L	2.8	U	1.9	J	1.7	J	
Cobalt	ug/L	0.8	U	0.8	U	0.8	U	
Copper	ug/L	4.5	U	1.4	U	1.5	J	
Iron	ug/L	14100	J	8590	=	7230	=	
Lead	ug/L	4.3	U	2.9	J	4.7	=	
Magnesium	ug/L	161000	=	126000	=	135000	=	
Manganese	ug/L	211	=	170	=	165	=	
Nickel	ug/L	1.6	J	0.97	J	0.72	J	
Potassium	ug/L	1440	J	79200	=	81600	=	
Selenium	ug/L	3.4	U	3.4	U	3.4	U	
Silver	ug/L	1	U	1	U	1	U	
Sodium	ug/L	94900	U	1570000	J	1630000	J	
Thallium	ug/L	5	U	5	U	5	U	
Vanadium	ug/L	16.6	J	12.2	J	12.3	J	
Zinc	ug/L	12.6	U	5.8	U	9.8	U	
Mercury	ug/L	0.1	U	0.1	U	0.1	U	

Groundwater SVOCs

Parameter	Units	StationID	F620GW001	F620GW002	F620GW003	F620GW003
		SampleID	620GW00104	620GW00204	620GW003A3	620GW003A4
		DateCollected	11/19/1997	11/17/1997	11/17/1997	2/11/1998
		DateExtracted	11/21/1997	11/19/1997	11/19/1997	2/13/1998
		DateAnalyzed	12/4/1997	12/3/1997	12/3/1997	2/18/1998
		SDGNumber	31911	31821	31821	32688
2,2'-Oxybis(1-chloro)propane	ug/L		10 U	10 U	10 U	10 U
4-Methylphenol (p-Cresol)	ug/L		10 U	10 U	10 U	10 U
N-Nitrosodiphenylamine	ug/L		10 U	10 U	10 U	10 U
Phenol	ug/L		10 U	10 U	10 U	10 U
bis(2-Chloroethyl) ether (2-Chloroethyl Ether)	ug/L		10 U	10 U	10 U	10 U
2-Chlorophenol	ug/L		10 U	10 U	10 U	10 U
1,3-Dichlorobenzene	ug/L		10 U	10 U	10 U	10 U
1,4-Dichlorobenzene	ug/L		10 U	10 U	10 U	10 U
Benzyl alcohol	ug/L		10 U	10 U	10 U	10 U
1,2-Dichlorobenzene	ug/L		10 U	10 U	10 U	10 U
2-Methylphenol (o-Cresol)	ug/L		10 U	10 U	10 U	10 U
N-Nitrosodi-n-propylamine	ug/L		10 U	10 U	10 U	10 U
Hexachloroethane	ug/L		10 U	10 U	10 U	10 U
Nitrobenzene	ug/L		10 U	10 U	10 U	10 U
Isophorone	ug/L		10 U	10 U	10 U	10 U
2-Nitrophenol	ug/L		10 U	10 U	10 U	10 U
2,4-Dimethylphenol	ug/L		10 U	10 U	10 U	10 U
bis(2-Chloroethoxy) Methane	ug/L		10 U	10 U	10 U	10 U
2,4-Dichlorophenol	ug/L		10 U	10 U	10 U	10 U
Benzoic acid	ug/L		50 U	50 U	50 U	50 U
Naphthalene	ug/L		10 U	10 U	10 U	10 U
4-Chloroaniline	ug/L		10 U	10 U	10 U	10 U
Hexachlorobutadiene	ug/L		10 U	10 U	10 U	10 U
4-Chloro-3-methylphenol	ug/L		10 U	10 U	10 U	10 U
2-Methylnaphthalene	ug/L		10 U	10 U	10 U	10 U
Hexachlorocyclopentadiene	ug/L		10 U	10 U	10 U	10 U
2,4,6-Trichlorophenol	ug/L		10 U	10 U	10 U	10 U
2,4,5-Trichlorophenol	ug/L		50 U	50 U	50 U	50 U
2-Chloronaphthalene	ug/L		10 U	10 U	10 U	10 U
2-Nitroaniline	ug/L		50 U	50 U	50 U	50 U

Groundwater SVOCs

Parameter	Units	StationID	F620GW004		F620GW004		F620GW004		F620GW004	
		SampleID	620GW004A3		620GW004A4		620HW004A4		620HW004A4DL	
		DateCollected	11/19/1997		2/11/1998		2/11/1998		2/11/1998	
		DateExtracted	11/21/1997		2/13/1998		2/13/1998		2/13/1998	
		DateAnalyzed	12/12/1997		2/18/1998		2/18/1998		2/20/1998	
		SDGNumber	31911		32688		32688		32688	
2,2'-Oxybis(1-chloro)propane	ug/L		11	U	10	U	10	U	20	R
4-Methylphenol (p-Cresol)	ug/L		11	U	10	U	10	U	20	R
N-Nitrosodiphenylamine	ug/L		11	U	10	U	10	U	20	R
Phenol	ug/L		11	U	10	U	10	U	20	R
bis(2-Chloroethyl) ether (2-Chloroethyl Ether)	ug/L		11	U	10	U	10	U	20	R
2-Chlorophenol	ug/L		11	U	10	U	10	U	20	R
1,3-Dichlorobenzene	ug/L		11	U	10	U	10	U	20	R
1,4-Dichlorobenzene	ug/L		11	U	10	U	10	U	20	R
Benzyl alcohol	ug/L		11	U	10	U	10	U	20	R
1,2-Dichlorobenzene	ug/L		11	U	10	U	10	U	20	R
2-Methylphenol (o-Cresol)	ug/L		11	U	10	U	10	U	20	R
N-Nitrosodi-n-propylamine	ug/L		11	U	10	U	10	U	20	R
Hexachloroethane	ug/L		11	U	10	U	10	U	20	R
Nitrobenzene	ug/L		11	U	10	U	10	U	20	R
Isophorone	ug/L		11	U	10	U	10	U	20	R
2-Nitrophenol	ug/L		11	U	10	U	10	U	20	R
2,4-Dimethylphenol	ug/L		11	U	10	U	10	U	20	R
bis(2-Chloroethoxy) Methane	ug/L		11	U	10	U	10	U	20	R
2,4-Dichlorophenol	ug/L		11	U	10	U	10	U	20	R
Benzoic acid	ug/L		55	U	50	U	50	U	100	R
Naphthalene	ug/L		11	U	10	U	10	U	20	R
4-Chloroaniline	ug/L		11	U	10	U	10	U	20	R
Hexachlorobutadiene	ug/L		11	U	10	U	10	U	20	R
4-Chloro-3-methylphenol	ug/L		11	U	10	U	10	U	20	R
2-Methylnaphthalene	ug/L		11	U	10	U	10	U	20	R
Hexachlorocyclopentadiene	ug/L		11	U	10	U	10	U	20	R
2,4,6-Trichlorophenol	ug/L		11	U	10	U	10	U	20	R
2,4,5-Trichlorophenol	ug/L		55	U	50	U	50	U	100	R
2-Chloronaphthalene	ug/L		11	U	10	U	10	U	20	R
2-Nitroaniline	ug/L		55	U	50	U	50	U	100	R

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Groundwater SVOCs

Parameter	Units	StationID	F620GW001		F620GW002		F620GW003		F620GW003	
		SampleID	620GW00104		620GW00204		620GW003A3		620GW003A4	
		DateCollected	11/19/1997		11/17/1997		11/17/1997		2/11/1998	
		DateExtracted	11/21/1997		11/19/1997		11/19/1997		2/13/1998	
		DateAnalyzed	12/4/1997		12/3/1997		12/3/1997		2/18/1998	
		SDGNumber	31911		31821		31821		32688	
3-Nitroaniline	ug/L		50	U	50	U	50	U	50	U
Dimethyl Phthalate	ug/L		10	U	10	U	10	U	10	U
2,6-Dinitrotoluene	ug/L		10	U	10	U	10	U	10	U
Acenaphthylene	ug/L		10	U	10	U	10	U	10	U
Acenaphthene	ug/L		10	U	10	U	2	J	10	U
2,4-Dinitrophenol	ug/L		50	U	50	U	50	U	50	U
Dibenzofuran	ug/L		10	U	10	U	10	U	10	U
2,4-Dinitrotoluene	ug/L		10	UJ	10	U	10	U	10	U
Diethyl Phthalate	ug/L		10	U	10	U	10	U	10	U
4-Nitrophenol	ug/L		50	U	50	U	50	U	50	U
Fluorene	ug/L		10	U	10	U	10	U	10	U
4-Chlorophenyl Phenyl Ether	ug/L		10	U	10	U	10	U	10	U
4,6-Dinitro-2-methylphenol	ug/L		50	U	50	U	50	U	50	U
4-Nitroaniline	ug/L		50	U	50	U	50	U	50	U
4-Bromophenyl Phenyl Ether	ug/L		10	U	10	U	10	U	10	U
Hexachlorobenzene	ug/L		10	U	10	U	10	U	10	U
Pentachlorophenol	ug/L		50	U	50	U	50	U	50	U
Phenanthrene	ug/L		10	U	10	U	10	U	10	U
Anthracene	ug/L		10	U	10	U	10	U	10	U
Di-n-butyl Phthalate	ug/L		10	U	10	U	10	U	10	U
Fluoranthene	ug/L		10	U	10	U	10	U	10	U
Pyrene	ug/L		10	U	10	U	10	U	10	U
Benzyl Butyl Phthalate	ug/L		10	U	10	U	10	U	10	U
Benzo(a)Anthracene	ug/L		10	U	10	U	10	U	10	U
3,3'-Dichlorobenzidine	ug/L		20	U	20	U	20	U	20	U
Chrysene	ug/L		10	U	10	U	10	U	10	U
bis(2-Ethylhexyl) Phthalate	ug/L		10	U	10	U	10	U	10	U
Di-n-octylphthalate	ug/L		10	U	10	U	10	U	10	U
Benzo(b)Fluoranthene	ug/L		10	U	10	U	10	U	10	U
Benzo(k)Fluoranthene	ug/L		10	U	10	U	10	U	10	U

Groundwater SVOCs

Parameter	Units	StationID	F620GW004		F620GW004		F620GW004		F620GW004	
		SampleID	620GW004A3		620GW004A4		620HW004A4		620HW004A4DL	
		DateCollected	11/19/1997		2/11/1998		2/11/1998		2/11/1998	
		DateExtracted	11/21/1997		2/13/1998		2/13/1998		2/13/1998	
		DateAnalyzed	12/12/1997		2/18/1998		2/18/1998		2/20/1998	
		SDGNumber	31911		32688		32688		32688	
3-Nitroaniline	ug/L		55	U	50	U	50	U	100	R
Dimethyl Phthalate	ug/L		11	U	10	U	10	U	20	R
2,6-Dinitrotoluene	ug/L		11	U	10	U	10	U	20	R
Acenaphthylene	ug/L		11	U	10	U	10	U	20	R
Acenaphthene	ug/L		11	U	10	U	10	U	20	R
2,4-Dinitrophenol	ug/L		55	U	50	U	50	U	100	R
Dibenzofuran	ug/L		11	U	10	U	10	U	20	R
2,4-Dinitrotoluene	ug/L		11	U	10	U	10	U	20	R
Diethyl Phthalate	ug/L		11	U	10	U	10	U	20	R
4-Nitrophenol	ug/L		55	U	50	U	50	U	100	R
Fluorene	ug/L		11	U	10	U	10	U	20	R
4-Chlorophenyl Phenyl Ether	ug/L		11	U	10	U	10	U	20	R
4,6-Dinitro-2-methylphenol	ug/L		55	U	50	U	50	U	100	R
4-Nitroaniline	ug/L		55	U	50	U	50	U	100	R
4-Bromophenyl Phenyl Ether	ug/L		11	U	10	U	10	U	20	R
Hexachlorobenzene	ug/L		11	U	10	U	10	U	20	R
Pentachlorophenol	ug/L		55	U	50	U	50	U	100	R
Phenanthrene	ug/L		11	U	10	U	10	U	20	R
Anthracene	ug/L		11	U	10	U	10	U	20	R
Di-n-butyl Phthalate	ug/L		11	U	10	U	10	U	20	R
Fluoranthene	ug/L		11	U	10	U	10	U	20	R
Pyrene	ug/L		11	U	10	U	10	U	20	R
Benzyl Butyl Phthalate	ug/L		11	U	10	U	2	J	20	R
Benzo(a)Anthracene	ug/L		11	U	10	U	10	U	20	R
3,3'-Dichlorobenzidine	ug/L		22	U	20	U	20	U	40	R
Chrysene	ug/L		11	U	10	U	10	U	20	R
bis(2-Ethylhexyl) Phthalate	ug/L		11	U	10	U	140	U	140	R
Di-n-octylphthalate	ug/L		11	U	10	U	10	U	20	R
Benzo(b)Fluoranthene	ug/L		11	U	10	U	10	U	20	R
Benzo(k)Fluoranthene	ug/L		11	U	10	U	10	U	20	R

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Groundwater SVOCs

	StationID	F620GW001		F620GW002		F620GW003		F620GW003	
	SampleID	620GW00104		620GW00204		620GW003A3		620GW003A4	
	DateCollected	11/19/1997		11/17/1997		11/17/1997		2/11/1998	
	DateExtracted	11/21/1997		11/19/1997		11/19/1997		2/13/1998	
	DateAnalyzed	12/4/1997		12/3/1997		12/3/1997		2/18/1998	
	SDGNumber	31911		31821		31821		32688	
Parameter	Units								
Benzo(a)Pyrene	ug/L	10	U	10	U	10	U	10	U
Indeno(1,2,3-c,d)pyrene	ug/L	10	U	10	U	10	U	10	U
Dibenz(a,h)anthracene	ug/L	10	U	10	U	10	U	10	U
Benzo(g,h,i)Perylene	ug/L	10	U	10	U	10	U	10	U

Groundwater SVOCs

Parameter	Units	StationID	F620GW004		F620GW004		F620GW004		F620GW004	
		SampleID	620GW004A3		620GW004A4		620HW004A4		620HW004A4DL	
		DateCollected	11/19/1997		2/11/1998		2/11/1998		2/11/1998	
		DateExtracted	11/21/1997		2/13/1998		2/13/1998		2/13/1998	
		DateAnalyzed	12/12/1997		2/18/1998		2/18/1998		2/20/1998	
		SDGNumber	31911		32688		32688		32688	
Benzo(a)Pyrene	ug/L		11	U	10	U	10	U	20	R
Indeno(1,2,3-c,d)pyrene	ug/L		11	U	10	U	10	U	20	R
Dibenz(a,h)anthracene	ug/L		11	U	10	U	10	U	20	R
Benzo(g,h,i)Perylene	ug/L		11	U	10	U	10	U	20	R

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Groundwater VOCs

Parameter	Units	StationID	F620GW001	F620GW001	F620GW002	F620GW002
		SampleID	620GW00104	620GW00104	620GW00204	620GW00204
		DateCollected	11/19/1997	11/19/1997	11/17/1997	11/17/1997
		DateExtracted		11/21/1997		11/19/1997
		DateAnalyzed	11/25/1997	12/4/1997	11/19/1997	12/3/1997
		SDGNumber	31911	31911	31821	31821
1,2,4-Trichlorobenzene	ug/L		10	U		10
Chloromethane	ug/L		5	U	10	U
Vinyl chloride	ug/L		5	U	10	U
Bromomethane	ug/L		5	U	10	U
Chloroethane	ug/L		5	U	10	U
1,1-Dichloroethene	ug/L		5	U	5	U
Acetone	ug/L		8	U	10	U
Carbon Disulfide	ug/L		5	U	5	U
Methylene Chloride	ug/L		6	U	5	U
1,1-Dichloroethane	ug/L		5	U	5	U
Vinyl acetate	ug/L		5	U	10	U
Methyl ethyl ketone (2-Butanone)	ug/L		5	U	10	U
1,2-Dichloroethene (total)	ug/L		5	U	5	U
Chloroform	ug/L		5	U	5	U
1,1,1-Trichloroethane	ug/L		5	U	5	U
Carbon Tetrachloride	ug/L		5	U	5	U
1,2-Dichloroethane	ug/L		5	U	5	U
Benzene	ug/L		5	U	5	U
Trichloroethylene (TCE)	ug/L		5	U	5	U
1,2-Dichloropropane	ug/L		5	U	5	U
Bromodichloromethane	ug/L		5	U	5	U
2-Chloroethyl vinyl ether	ug/L		5	U	10	U
cis-1,3-Dichloropropene	ug/L		5	U	5	U
Methyl isobutyl ketone (4-Methyl-2-pentanone)	ug/L		5	U	10	U
Toluene	ug/L		5	U	5	U
trans-1,3-Dichloropropene	ug/L		5	U	5	U
1,1,2-Trichloroethane	ug/L		5	U	5	U
2-Hexanone	ug/L		5	U	10	U
Tetrachloroethylene (PCE)	ug/L		5	U	5	U
Dibromochloromethane	ug/L		5	U	5	U

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Groundwater VOCs

Groundwater VOCs	StationID	F620GW003	F620GW003	F620GW003	F620GW003
	SampleID	620GW003A3	620GW003A3	620GW003A4	620GW003A4
	DateCollected	11/17/1997	11/17/1997	2/11/1998	2/11/1998
	DateExtracted		11/19/1997		2/13/1998
	DateAnalyzed	11/21/1997	12/3/1997	2/13/1998	2/18/1998
	SDGNumber	31821	31821	32688	32688
Parameter	Units				
1,2,4-Trichlorobenzene	ug/L		10 U		10 U
Chloromethane	ug/L	10 U		5 U	
Vinyl chloride	ug/L	10 U		5 U	
Bromomethane	ug/L	10 U		5 U	
Chloroethane	ug/L	10 U		5 U	
1,1-Dichloroethene	ug/L	5 U		5 U	
Acetone	ug/L	10 U		5 U	
Carbon Disulfide	ug/L	5 U		5 U	
Methylene Chloride	ug/L	5 U		5 U	
1,1-Dichloroethane	ug/L	5 U		5 U	
Vinyl acetate	ug/L	10 U		5 U	
Methyl ethyl ketone (2-Butanone)	ug/L	10 U		5 U	
1,2-Dichloroethene (total)	ug/L	5 U		5 U	
Chloroform	ug/L	5 U		5 U	
1,1,1-Trichloroethane	ug/L	5 U		5 U	
Carbon Tetrachloride	ug/L	5 U		5 U	
1,2-Dichloroethane	ug/L	5 U		5 U	
Benzene	ug/L	5 U		5 U	
Trichloroethylene (TCE)	ug/L	5 U		5 U	
1,2-Dichloropropane	ug/L	5 U		5 U	
Bromodichloromethane	ug/L	5 U		5 U	
2-Chloroethyl vinyl ether	ug/L	10 U		5 U	
cis-1,3-Dichloropropene	ug/L	5 U		5 U	
Methyl isobutyl ketone (4-Methyl-2-pentanone)	ug/L	10 U		5 U	
Toluene	ug/L	5 U		5 U	
trans-1,3-Dichloropropene	ug/L	5 U		5 U	
1,1,2-Trichloroethane	ug/L	5 U		5 U	
2-Hexanone	ug/L	10 U		5 U	
Tetrachloroethylene (PCE)	ug/L	5 U		5 U	
Dibromochloromethane	ug/L	5 U		5 U	

Groundwater VOCs

Parameter	Units	StationID		SampleID		DateCollected		DateExtracted		DateAnalyzed		SDGNumber	
		F620GW004		F620GW004		F620GW004		F620GW004		F620GW004		F620GW004	
		620GW004A3		620GW004A3		620GW004A4		620GW004A4		620GW004A4		620GW004A4	
		11/19/1997		11/19/1997		2/11/1998		2/11/1998		2/11/1998		2/11/1998	
				11/21/1997				2/13/1998		2/13/1998		2/13/1998	
		11/25/1997		12/12/1997		2/13/1998		2/13/1998		2/18/1998		2/18/1998	
		31911		31911		32688		32688		32688		32688	
1,2,4-Trichlorobenzene	ug/L			11		U				10		U	
Chloromethane	ug/L	5		U				5		U			
Vinyl chloride	ug/L	5		U				5		U			
Bromomethane	ug/L	5		UJ				5		U			
Chloroethane	ug/L	5		UJ				5		U			
1,1-Dichloroethene	ug/L	5		U				5		U			
Acetone	ug/L	5		U				5		U			
Carbon Disulfide	ug/L	5		U				5		U			
Methylene Chloride	ug/L	7		U				5		U			
1,1-Dichloroethane	ug/L	5		U				5		U			
Vinyl acetate	ug/L	5		U				5		U			
Methyl ethyl ketone (2-Butanone)	ug/L	5		U				5		U			
1,2-Dichloroethene (total)	ug/L	5		U				5		U			
Chloroform	ug/L	5		U				5		U			
1,1,1-Trichloroethane	ug/L	5		U				5		U			
Carbon Tetrachloride	ug/L	5		U				5		U			
1,2-Dichloroethane	ug/L	5		U				5		U			
Benzene	ug/L	5		U				5		U			
Trichloroethylene (TCE)	ug/L	5		U				5		U			
1,2-Dichloropropane	ug/L	5		U				5		U			
Bromodichloromethane	ug/L	5		U				5		U			
2-Chloroethyl vinyl ether	ug/L	5		U				5		U			
cis-1,3-Dichloropropene	ug/L	5		U				5		U			
Methyl isobutyl ketone (4-Methyl-2-pentanone)	ug/L	5		U				5		U			
Toluene	ug/L	5		U				5		U			
trans-1,3-Dichloropropene	ug/L	5		U				5		U			
1,1,2-Trichloroethane	ug/L	5		U				5		U			
2-Hexanone	ug/L	5		U				5		U			
Tetrachloroethylene (PCE)	ug/L	5		U				5		U			
Dibromochloromethane	ug/L	5		U				5		U			

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Groundwater VOCs

Parameter	Units	StationID		SampleID		DateCollected		DateExtracted		DateAnalyzed		SDGNumber	
		F620GW004		F620GW004		F620GW004		F620GW004		F620GW004		F620GW004	
		620HW004A4		620HW004A4		620HW004A4DL							
		2/11/1998		2/11/1998		2/11/1998							
				2/13/1998		2/13/1998							
		2/13/1998		2/18/1998		2/20/1998							
		32688		32688		32688							
1,2,4-Trichlorobenzene	ug/L			10	U	20	R						
Chloromethane	ug/L	5	U										
Vinyl chloride	ug/L	5	U										
Bromomethane	ug/L	5	U										
Chloroethane	ug/L	5	U										
1,1-Dichloroethene	ug/L	5	U										
Acetone	ug/L	5	U										
Carbon Disulfide	ug/L	5	U										
Methylene Chloride	ug/L	5	U										
1,1-Dichloroethane	ug/L	5	U										
Vinyl acetate	ug/L	5	U										
Methyl ethyl ketone (2-Butanone)	ug/L	5	U										
1,2-Dichloroethene (total)	ug/L	5	U										
Chloroform	ug/L	5	U										
1,1,1-Trichloroethane	ug/L	5	U										
Carbon Tetrachloride	ug/L	5	U										
1,2-Dichloroethane	ug/L	5	U										
Benzene	ug/L	5	U										
Trichloroethylene (TCE)	ug/L	5	U										
1,2-Dichloropropane	ug/L	5	U										
Bromodichloromethane	ug/L	5	U										
2-Chloroethyl vinyl ether	ug/L	5	U										
cis-1,3-Dichloropropene	ug/L	5	U										
Methyl isobutyl ketone (4-Methyl-2-pentanone)	ug/L	5	U										
Toluene	ug/L	5	U										
trans-1,3-Dichloropropene	ug/L	5	U										
1,1,2-Trichloroethane	ug/L	5	U										
2-Hexanone	ug/L	5	U										
Tetrachloroethylene (PCE)	ug/L	5	U										
Dibromochloromethane	ug/L	5	U										

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Groundwater VOCs

Parameter	Units	StationID	F620GW001	F620GW001	F620GW002	F620GW002
		SampleID	620GW00104	620GW00104	620GW00204	620GW00204
		DateCollected	11/19/1997	11/19/1997	11/17/1997	11/17/1997
		DateExtracted		11/21/1997		11/19/1997
		DateAnalyzed	11/25/1997	12/4/1997	11/19/1997	12/3/1997
		SDGNumber	31911	31911	31821	31821
Chlorobenzene	ug/L		5	U	5	U
Ethylbenzene	ug/L		1	J	5	U
Xylenes, Total	ug/L		7	=	5	U
Styrene	ug/L		5	U	5	U
Bromoform	ug/L		5	U	5	U
1,1,2,2-Tetrachloroethane	ug/L		5	U	5	U

Groundwater VOCs

Parameter	Units	StationID	F620GW003	F620GW003	F620GW003	F620GW003
		SampleID	620GW003A3	620GW003A3	620GW003A4	620GW003A4
		DateCollected	11/17/1997	11/17/1997	2/11/1998	2/11/1998
		DateExtracted		11/19/1997		2/13/1998
		DateAnalyzed	11/21/1997	12/3/1997	2/13/1998	2/18/1998
		SDGNumber	31821	31821	32688	32688
Chlorobenzene	ug/L		5	U	5	U
Ethylbenzene	ug/L		5	U	5	U
Xylenes, Total	ug/L		5	U	5	U
Styrene	ug/L		5	U	5	U
Bromoform	ug/L		5	U	5	U
1,1,2,2-Tetrachloroethane	ug/L		5	U	5	U

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Groundwater VOCs

Parameter	Units	StationID	F620GW004	F620GW004	F620GW004	F620GW004
		SampleID	620GW004A3	620GW004A3	620GW004A4	620GW004A4
		DateCollected	11/19/1997	11/19/1997	2/11/1998	2/11/1998
		DateExtracted		11/21/1997		2/13/1998
		DateAnalyzed	11/25/1997	12/12/1997	2/13/1998	2/18/1998
		SDGNumber	31911	31911	32688	32688
Chlorobenzene	ug/L		5	U		
Ethylbenzene	ug/L		5	U		
Xylenes, Total	ug/L		2	J		
Styrene	ug/L		5	U		
Bromoform	ug/L		5	U		
1,1,2,2-Tetrachloroethane	ug/L		5	U		

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Groundwater VOCs

		StationID	F620GW004	F620GW004	F620GW004
		SampleID	620HW004A4	620HW004A4	620HW004A4DL
		DateCollected	2/11/1998	2/11/1998	2/11/1998
		DateExtracted		2/13/1998	2/13/1998
		DateAnalyzed	2/13/1998	2/18/1998	2/20/1998
		SDGNumber	32688	32688	32688
Parameter	Units				
Chlorobenzene	ug/L	5	U		
Ethylbenzene	ug/L	5	U		
Xylenes, Total	ug/L	5	U		
Styrene	ug/L	5	U		
Bromoform	ug/L	5	U		
1,1,2,2-Tetrachloroethane	ug/L	5	U		

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Groundwater Metals	StationID	F620GW002		F620GW002		F620GW004		F620ZDRM1		F620ZDRM1	
	SampleID	620GW002L1		620GW002L1		620GW004L1		620ZDRM1M1		620ZDRM1M1	
	DateCollected	10/11/2001		10/11/2001		10/11/2001		1/24/2002		1/24/2002	
	DateExtracted	10/12/2001		10/15/2001		10/15/2001		1/28/2002		1/28/2002	
	DateAnalyzed	10/12/2001		10/16/2001		10/16/2001		1/31/2002		1/29/2002	
	SDGNumber	50283D		50283D		50283D		55141W		55141W	
Parameter	Units										
Lead	ug/L			2.43	U	3.56	U	771	=		
Mercury	ug/L	0.064	U							0.515	=

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Soil VOCs

StationID	F620SB017	F620SB017	F620SB018
SampleID	620SB01701 (0-1ft)	620SB01703 (-ft)	620CB01801 (0-1ft)
DateCollected	6/6/2001	6/6/2001	6/6/2001
DateExtracted	6/19/2001	6/19/2001	6/19/2001
DateAnalyzed	6/19/2001	6/19/2001	6/19/2001
SDGNumber	43561	43561	43561
Parameter	Units		
Chloromethane	ug/Kg	11.6 U	19.2 U
Vinyl chloride	ug/Kg	11.6 U	19.2 U
Bromomethane	ug/Kg	11.6 U	19.2 U
Chloroethane	ug/Kg	11.6 U	19.2 U
1,1-Dichloroethene	ug/Kg	5.8 U	9.6 U
Acetone	ug/Kg	33.5 J	63.4 J
Carbon Disulfide	ug/Kg	5.8 U	29 =
Methylene Chloride	ug/Kg	11.6 U	19.2 U
trans-1,2-Dichloroethene	ug/Kg	5.8 U	9.6 U
1,1-Dichloroethane	ug/Kg	5.8 U	9.6 U
Vinyl acetate	ug/Kg	11.6 U	19.2 U
Methyl ethyl ketone (2-Butanone)	ug/Kg	16 J	23.3 J
cis-1,2-Dichloroethylene	ug/Kg	5.8 U	9.6 U
1,2-Dichloroethene (total)	ug/Kg	5.8 U	9.6 U
Chloroform	ug/Kg	5.8 U	9.6 U
1,1,1-Trichloroethane	ug/Kg	5.8 U	9.6 U
Carbon Tetrachloride	ug/Kg	5.8 U	9.6 U
1,2-Dichloroethane	ug/Kg	5.8 U	9.6 U
Benzene	ug/Kg	1 J	9.6 U
Trichloroethylene (TCE)	ug/Kg	5.8 U	9.6 U
1,2-Dichloropropane	ug/Kg	5.8 U	9.6 U
Bromodichloromethane	ug/Kg	5.8 U	9.6 U
2-Chloroethyl vinyl ether	ug/Kg	11.6 UJ	19.2 UJ
cis-1,3-Dichloropropene	ug/Kg	5.8 U	9.6 U
Methyl isobutyl ketone (4-Methyl-2-pentanone)	ug/Kg	11.6 U	19.2 U
Toluene	ug/Kg	5.8 U	9.6 U
trans-1,3-Dichloropropene	ug/Kg	5.8 U	9.6 U
1,1,2-Trichloroethane	ug/Kg	5.8 U	9.6 U
2-Hexanone	ug/Kg	11.6 U	19.2 U
Tetrachloroethylene (PCE)	ug/Kg	5.8 U	9.6 U

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Soil VOCs

Parameter	Units	F620SB018		F620SB018	
		620SB01801 (0-1ft)		620SB01803 (-ft)	
StationID		620SB01801 (0-1ft)		620SB01803 (-ft)	
SampleID		620SB01801 (0-1ft)		620SB01803 (-ft)	
DateCollected		6/6/2001		6/6/2001	
DateExtracted		6/19/2001		6/19/2001	
DateAnalyzed		6/19/2001		6/19/2001	
SDGNumber		43561		43561	
Parameter	Units				
Chloromethane	ug/Kg	12.3	U	19.7	U
Vinyl chloride	ug/Kg	12.3	U	19.7	U
Bromomethane	ug/Kg	12.3	U	19.7	U
Chloroethane	ug/Kg	12.3	U	19.7	U
1,1-Dichloroethene	ug/Kg	6.2	U	9.9	U
Acetone	ug/Kg	14.6	J	109	J
Carbon Disulfide	ug/Kg	6.2	U	22	=
Methylene Chloride	ug/Kg	12.3	U	19.7	U
trans-1,2-Dichloroethene	ug/Kg	6.2	U	9.9	U
1,1-Dichloroethane	ug/Kg	6.2	U	9.9	U
Vinyl acetate	ug/Kg	12.3	U	19.7	U
Methyl ethyl ketone (2-Butanone)	ug/Kg	12.3	UJ	19.7	UJ
cis-1,2-Dichloroethylene	ug/Kg	6.2	U	9.9	U
1,2-Dichloroethene (total)	ug/Kg	6.2	U	9.9	U
Chloroform	ug/Kg	6.2	U	9.9	U
1,1,1-Trichloroethane	ug/Kg	6.2	U	9.9	U
Carbon Tetrachloride	ug/Kg	6.2	U	9.9	U
1,2-Dichloroethane	ug/Kg	6.2	U	9.9	U
Benzene	ug/Kg	6.2	U	9.9	U
Trichloroethylene (TCE)	ug/Kg	6.2	U	9.9	U
1,2-Dichloropropane	ug/Kg	6.2	U	9.9	U
Bromodichloromethane	ug/Kg	6.2	U	9.9	U
2-Chloroethyl vinyl ether	ug/Kg	12.3	UJ	19.7	UJ
cis-1,3-Dichloropropene	ug/Kg	6.2	U	9.9	U
Methyl isobutyl ketone (4-Methyl-2-pentanone)	ug/Kg	12.3	U	19.7	U
Toluene	ug/Kg	6.2	U	9.9	U
trans-1,3-Dichloropropene	ug/Kg	6.2	U	9.9	U
1,1,2-Trichloroethane	ug/Kg	6.2	U	9.9	U
2-Hexanone	ug/Kg	12.3	U	19.7	U
Tetrachloroethylene (PCE)	ug/Kg	6.2	U	9.9	U

Analytical Data Summary

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Soil VOCs

StationID	F620SB017	F620SB017	F620SB018
SampleID	620SB01701 (0-1ft)	620SB01703 (-ft)	620CB01801 (0-1ft)
DateCollected	6/6/2001	6/6/2001	6/6/2001
DateExtracted	6/19/2001	6/19/2001	6/19/2001
DateAnalyzed	6/19/2001	6/19/2001	6/19/2001
SDGNumber	43561	43561	43561
Parameter	Units		
Dibromochloromethane	ug/Kg	5.8 U	9.6 U 7.2 U
Chlorobenzene	ug/Kg	5.8 U	9.6 U 7.2 U
Ethylbenzene	ug/Kg	5.8 U	9.6 U 7.2 U
m+p Xylene	ug/Kg	5.8 U	9.6 U 7.2 U
o-Xylene	ug/Kg	5.8 U	9.6 U 7.2 U
Xylenes, Total	ug/Kg	5.8 U	9.6 U 7.2 U
Styrene	ug/Kg	5.8 U	9.6 U 7.2 U
Bromoform	ug/Kg	5.8 U	9.6 U 7.2 U
1,1,2,2-Tetrachloroethane	ug/Kg	5.8 UJ	9.6 UJ 7.2 UJ

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Soil VOCs

	StationID	SampleID	F620SB018		F620SB018	
			620SB01801 (0-1ft)		620SB01803 (-ft)	
DateCollected			6/6/2001		6/6/2001	
DateExtracted			6/19/2001		6/19/2001	
DateAnalyzed			6/19/2001		6/19/2001	
SDGNumber			43561		43561	
Parameter	Units					
Dibromochloromethane	ug/Kg		6.2	U	9.9	U
Chlorobenzene	ug/Kg		6.2	U	9.9	U
Ethylbenzene	ug/Kg		6.2	U	9.9	U
m+p Xylene	ug/Kg		6.2	U	9.9	U
o-Xylene	ug/Kg		6.2	U	9.9	U
Xylenes, Total	ug/Kg		6.2	U	9.9	U
Styrene	ug/Kg		6.2	U	9.9	U
Bromoform	ug/Kg		6.2	U	9.9	U
1,1,2,2-Tetrachloroethane	ug/Kg		6.2	UJ	9.9	UJ

Soil SVOCs

Parameter	Units	F620SB017		F620SB017		F620SB018	
		620SB01701 (0-1ft)		620SB01703 (-ft)		620CB01801 (0-1ft)	
StationID	SampleID	620SB01701 (0-1ft)		620SB01703 (-ft)		620CB01801 (0-1ft)	
DateCollected		6/6/2001		6/6/2001		6/6/2001	
DateExtracted		6/13/2001		6/13/2001		6/13/2001	
DateAnalyzed		6/18/2001		6/16/2001		6/18/2001	
SDGNumber		43561		43561		43561	
2,2'-Oxybis(1-chloro)propane	ug/Kg	1500	U	534	U	408	U
N-Nitrosodiphenylamine	ug/Kg	1500	U	534	U	408	U
Phenol	ug/Kg	1500	U	534	U	408	U
bis(2-Chloroethyl) ether (2-Chloroethyl Ether)	ug/Kg	1500	U	534	U	408	U
2-Chlorophenol	ug/Kg	1500	U	534	U	408	U
1,3-Dichlorobenzene	ug/Kg	1500	U	534	U	408	U
1,4-Dichlorobenzene	ug/Kg	1500	U	534	U	408	U
Benzyl alcohol	ug/Kg	1500	U	534	U	408	U
1,2-Dichlorobenzene	ug/Kg	1500	U	534	U	408	U
2-Methylphenol (o-Cresol)	ug/Kg	1500	U	534	U	408	U
3-Methylphenol/4-Methylphenol (mp-Cresol)	ug/Kg	1500	U	534	U	408	U
Hexachloroethane	ug/Kg	1500	U	534	U	408	U
Nitrobenzene	ug/Kg	1500	U	534	U	408	U
Isophorone	ug/Kg	1500	U	534	U	408	U
2-Nitrophenol	ug/Kg	1500	U	534	U	408	U
2,4-Dimethylphenol	ug/Kg	1500	U	534	U	408	U
bis(2-Chloroethoxy) Methane	ug/Kg	1500	U	534	U	408	U
2,4-Dichlorophenol	ug/Kg	1500	U	534	U	408	U
Benzoic acid	ug/Kg	7280	UJ	2590	UJ	1980	UJ
1,2,4-Trichlorobenzene	ug/Kg	1500	U	534	U	408	U
Naphthalene	ug/Kg	1500	U	534	U	408	U
4-Chloroaniline	ug/Kg	1500	U	534	U	408	U
Hexachlorobutadiene	ug/Kg	1500	U	534	U	408	U
4-Chloro-3-methylphenol	ug/Kg	1500	U	534	U	408	U
2-Methylnaphthalene	ug/Kg	1500	U	534	U	408	U
Hexachlorocyclopentadiene	ug/Kg	1500	U	534	UJ	408	UJ
2,4,6-Trichlorophenol	ug/Kg	1500	U	534	U	408	U
2,4,5-Trichlorophenol	ug/Kg	7280	U	2590	U	1980	U
2-Chloronaphthalene	ug/Kg	1500	U	534	U	408	U
2-Nitroaniline	ug/Kg	7280	U	2590	U	1980	U

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Soil SVOCs

Parameter	Units	F620SB018		F620SB018	
		StationID	SampleID	StationID	SampleID
			620SB01801 (0-1ft)		620SB01803 (-ft)
		DateCollected	6/6/2001	DateCollected	6/6/2001
		DateExtracted	6/13/2001	DateExtracted	6/13/2001
		DateAnalyzed	6/16/2001	DateAnalyzed	6/16/2001
		SDGNumber	43561	SDGNumber	43561
2,2'-Oxybis(1-chloro)propane	ug/Kg	1590	U	535	U
N-Nitrosodiphenylamine	ug/Kg	1590	U	535	U
Phenol	ug/Kg	1590	U	535	U
bis(2-Chloroethyl) ether (2-Chloroethyl Ether)	ug/Kg	1590	U	535	U
2-Chlorophenol	ug/Kg	1590	U	535	U
1,3-Dichlorobenzene	ug/Kg	1590	U	535	U
1,4-Dichlorobenzene	ug/Kg	1590	U	535	U
Benzyl alcohol	ug/Kg	1590	U	535	U
1,2-Dichlorobenzene	ug/Kg	1590	U	535	U
2-Methylphenol (o-Cresol)	ug/Kg	1590	U	535	U
3-Methylphenol/4-Methylphenol (mp-Cresol)	ug/Kg	1590	U	535	U
Hexachloroethane	ug/Kg	1590	U	535	U
Nitrobenzene	ug/Kg	1590	U	535	U
Isophorone	ug/Kg	1590	U	535	U
2-Nitrophenol	ug/Kg	1590	U	535	U
2,4-Dimethylphenol	ug/Kg	1590	U	535	U
bis(2-Chloroethoxy) Methane	ug/Kg	1590	U	535	U
2,4-Dichlorophenol	ug/Kg	1590	U	535	U
Benzoic acid	ug/Kg	7720	UJ	2590	UJ
1,2,4-Trichlorobenzene	ug/Kg	1590	U	535	U
Naphthalene	ug/Kg	1590	U	535	U
4-Chloroaniline	ug/Kg	1590	U	535	U
Hexachlorobutadiene	ug/Kg	1590	U	535	U
4-Chloro-3-methylphenol	ug/Kg	1590	U	535	U
2-Methylnaphthalene	ug/Kg	1590	U	535	U
Hexachlorocyclopentadiene	ug/Kg	1590	UJ	535	UJ
2,4,6-Trichlorophenol	ug/Kg	1590	U	535	U
2,4,5-Trichlorophenol	ug/Kg	7720	U	2590	U
2-Chloronaphthalene	ug/Kg	1590	U	535	U
2-Nitroaniline	ug/Kg	7720	U	2590	U

Soil SVOCs

Parameter	Units	F620SB017		F620SB017		F620SB018	
		StationID	SampleID	StationID	SampleID	StationID	SampleID
			620SB01701 (0-1ft)		620SB01703 (-ft)		620CB01801 (0-1ft)
		DateCollected	6/6/2001	DateCollected	6/6/2001	DateCollected	6/6/2001
		DateExtracted	6/13/2001	DateExtracted	6/13/2001	DateExtracted	6/13/2001
		DateAnalyzed	6/18/2001	DateAnalyzed	6/16/2001	DateAnalyzed	6/18/2001
		SDGNumber	43561	SDGNumber	43561	SDGNumber	43561
3-Nitroaniline	ug/Kg		7280 U		2590 U		1980 U
Dimethyl Phthalate	ug/Kg		1500 U		534 U		408 U
2,6-Dinitrotoluene	ug/Kg		1500 U		534 U		408 U
Acenaphthylene	ug/Kg		1500 U		534 U		7.8 J
Acenaphthene	ug/Kg		1500 U		534 U		408 U
2,4-Dinitrophenol	ug/Kg		7280 U		2590 U		1980 U
Dibenzofuran	ug/Kg		1500 U		534 U		408 U
2,4-Dinitrotoluene	ug/Kg		1500 U		534 U		408 U
Diethyl Phthalate	ug/Kg		1500 U		534 U		408 U
4-Nitrophenol	ug/Kg		7280 U		2590 U		1980 U
Fluorene	ug/Kg		1500 U		534 U		408 U
4-Chlorophenyl Phenyl Ether	ug/Kg		1500 U		534 U		408 U
4,6-Dinitro-2-methylphenol	ug/Kg		7280 UJ		2590 UJ		1980 UJ
4-Nitroaniline	ug/Kg		7280 UJ		2590 U		1980 U
Diphenylamine	ug/Kg		1500 U		534 U		408 U
4-Bromophenyl Phenyl Ether	ug/Kg		1500 U		534 U		408 U
Hexachlorobenzene	ug/Kg		1500 U		534 U		408 U
Pentachlorophenol	ug/Kg		7280 UJ		2590 UJ		1980 UJ
Phenanthrene	ug/Kg		1500 U		13.2 J		25.2 J
Anthracene	ug/Kg		1500 U		534 U		408 U
Di-n-butyl Phthalate	ug/Kg		1500 U		534 U		408 U
Fluoranthene	ug/Kg		58.1 J		36.1 J		90.1 J
Pyrene	ug/Kg		58.8 J		41 J		118 J
Benzyl Butyl Phthalate	ug/Kg		1500 U		534 U		408 U
Benzo(a)Anthracene	ug/Kg		38.4 J		32.2 J		71.4 J
3,3'-Dichlorobenzidine	ug/Kg		3000 U		1070 U		815 U
Chrysene	ug/Kg		43.4 J		33.3 J		104 J
bis(2-Ethylhexyl) Phthalate	ug/Kg		1500 U		534 U		408 U
Di-n-octylphthalate	ug/Kg		1500 U		534 U		408 U
Benzo(b)Fluoranthene	ug/Kg		1040 J		389 J		400 J

Analytical Data Summary

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Soil SVOCs

StationID SampleID	F620SB018		F620SB018	
	620SB01801 (0-1ft)		620SB01803 (-ft)	
DateCollected	6/6/2001		6/6/2001	
DateExtracted	6/13/2001		6/13/2001	
DateAnalyzed	6/16/2001		6/16/2001	
SDGNumber	43561		43561	
Parameter	Units			
3-Nitroaniline	ug/Kg	7720 U	2590	U
Dimethyl Phthalate	ug/Kg	1590 U	535	U
2,6-Dinitrotoluene	ug/Kg	1590 U	535	U
Acenaphthylene	ug/Kg	1590 U	6.4	J
Acenaphthene	ug/Kg	1590 U	535	U
2,4-Dinitrophenol	ug/Kg	7720 U	2590	U
Dibenzofuran	ug/Kg	1590 U	535	U
2,4-Dinitrotoluene	ug/Kg	1590 U	535	U
Diethyl Phthalate	ug/Kg	1590 U	535	U
4-Nitrophenol	ug/Kg	7720 U	2590	U
Fluorene	ug/Kg	1590 U	535	U
4-Chlorophenyl Phenyl Ether	ug/Kg	1590 U	535	U
4,6-Dinitro-2-methylphenol	ug/Kg	7720 UJ	2590	UJ
4-Nitroaniline	ug/Kg	7720 U	2590	U
Diphenylamine	ug/Kg	1590 U	535	U
4-Bromophenyl Phenyl Ether	ug/Kg	1590 U	535	U
Hexachlorobenzene	ug/Kg	1590 U	535	U
Pentachlorophenol	ug/Kg	7720 UJ	2590	UJ
Phenanthrene	ug/Kg	1590 U	535	U
Anthracene	ug/Kg	1590 U	535	U
Di-n-butyl Phthalate	ug/Kg	1590 U	535	U
Fluoranthene	ug/Kg	114 J	21.1	J
Pyrene	ug/Kg	132 J	26.8	J
Benzyl Butyl Phthalate	ug/Kg	1590 U	535	U
Benzo(a)Anthracene	ug/Kg	112 J	32	J
3,3'-Dichlorobenzidine	ug/Kg	3180 U	1070	U
Chrysene	ug/Kg	127 J	24.3	J
bis(2-Ethylhexyl) Phthalate	ug/Kg	1590 U	535	U
Di-n-octylphthalate	ug/Kg	1590 U	535	U
Benzo(b)Fluoranthene	ug/Kg	1150 J	375	J

Analytical Data Summary

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Soil SVOCs

StationID	F620SB017	F620SB017	F620SB018
SampleID	620SB01701 (0-1ft)	620SB01703 (-ft)	620CB01801 (0-1ft)
DateCollected	6/6/2001	6/6/2001	6/6/2001
DateExtracted	6/13/2001	6/13/2001	6/13/2001
DateAnalyzed	6/18/2001	6/16/2001	6/18/2001
SDGNumber	43561	43561	43561
Units			
Benzo(k)Fluoranthene	ug/Kg	34.8 J	32 J
Benzo(a)Pyrene	ug/Kg	1500 U	34.2 J
Indeno(1,2,3-c,d)pyrene	ug/Kg	1500 U	534 U
Dibenz(a,h)anthracene	ug/Kg	1500 U	534 U
Benzo(g,h,i)Perylene	ug/Kg	1500 U	24.7 J
Carbazole	ug/Kg	1500 U	534 U

Analytical Data Summary

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Soil SVOCs

		StationID		F620SB018		F620SB018	
		SampleID		620SB01801 (0-1ft)		620SB01803 (-ft)	
		DateCollected		6/6/2001		6/6/2001	
		DateExtracted		6/13/2001		6/13/2001	
		DateAnalyzed		6/16/2001		6/16/2001	
		SDGNumber		43561		43561	
Parameter	Units						
Benzo(k)Fluoranthene	ug/Kg	136	J	30.4	J		
Benzo(a)Pyrene	ug/Kg	92.8	J	30.8	J		
Indeno(1,2,3-c,d)pyrene	ug/Kg	70.5	J	20.1	J		
Dibenz(a,h)anthracene	ug/Kg	1590	U	535	U		
Benzo(g,h,i)Perylene	ug/Kg	72.9	J	18.8	J		
Carbazole	ug/Kg	1590	U	535	U		

Analytic Data Summary

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Soil PCBs

Soil PCBs	StationID	F620SB015		F620SB016		F620SB017		F620SB018		F620SB018	
	SampleID	620SB01501 (0-1ft)		620SB01601 (0-1ft)		620SB01701 (0-1ft)		620CB01801 (0-1ft)		620SB01801 (0-1ft)	
	DateCollected	6/6/2001		6/6/2001		6/6/2001		6/6/2001		6/6/2001	
	DateExtracted	6/8/2001		6/8/2001		6/7/2001		6/8/2001		6/7/2001	
	DateAnalyzed	6/12/2001		6/12/2001		6/11/2001		6/12/2001		6/11/2001	
	SDGNumber	43561		43561		43522		43561		43522	
Parameter	Units										
PCB-1016 (Arochlor 1016)	ug/Kg	212	U	33	U	37.7	U	41.2	U	41.5	U
PCB-1221 (Arochlor 1221)	ug/Kg	212	U	33	U	37.7	U	41.2	U	41.5	U
PCB-1232 (Arochlor 1232)	ug/kg	212	U	33	U	37.7	U	41.2	U	41.5	U
PCB-1242 (Arochlor 1242)	ug/Kg	212	U	33	U	37.7	U	41.2	U	41.5	U
PCB-1248 (Arochlor 1248)	ug/kg	212	U	33	U	37.7	U	41.2	U	41.5	U
PCB-1254 (Arochlor 1254)	ug/kg	212	U	233	=	76.6	U	67	U	84.3	U
PCB-1260 (Arochlor 1260)	ug/Kg	212	U	45.8	J	76.6	U	67	U	84.3	U

Analytical Data Summary

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Soil PCBs

Soil PCBs	StationID	F620SB019				F620SB019				F620SB020				F620SB020							
	SampleID	620SB01901 (0-1ft)				620SB01903 (-ft)				620SB01903RE (-ft)				620SB02001 (0-1ft)				620SB02003 (-ft)			
	DateCollected	6/6/2001				6/6/2001				6/6/2001				6/6/2001				6/6/2001			
	DateExtracted	6/7/2001				6/19/2001				7/7/2001				6/7/2001				6/19/2001			
	DateAnalyzed	6/11/2001				6/29/2001				7/8/2001				6/11/2001				6/29/2001			
	SDGNumber	43522				44280				44280				43522				44280			
	Parameter	Units																			
PCB-1016 (Arochlor 1016)	ug/Kg	77.8	U	33	U	78	R	37.8	U	37.7	UJ										
PCB-1221 (Arochlor 1221)	ug/Kg	77.8	U	33	U	78	R	37.8	U	37.7	UJ										
PCB-1232 (Arochlor 1232)	ug/kg	77.8	U	33	U	78	R	37.8	U	37.7	UJ										
PCB-1242 (Arochlor 1242)	ug/Kg	77.8	U	33	U	78	R	37.8	U	37.7	UJ										
PCB-1248 (Arochlor 1248)	ug/kg	77.8	U	33	U	78	R	37.8	U	37.7	UJ										
PCB-1254 (Arochlor 1254)	ug/kg	1120	=	253	=	390	R	76.8	U	9.1	J										
PCB-1260 (Arochlor 1260)	ug/Kg	293	=	42.8	J	78	R	76.8	U	76.5	UJ										

Analytical Data Summary

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Soil PCBs

Parameter	Units	StationID		F620SB020		F620SB021		F620SB021		F620SB021	
		SampleID		620SB02003RE (-ft)		620SB02101 (0-1ft)		620SB02103 (-ft)		620SB02103RE (-ft)	
		DateCollected		6/6/2001		6/6/2001		6/6/2001		6/6/2001	
		DateExtracted		7/7/2001		6/7/2001		6/19/2001		7/7/2001	
		DateAnalyzed		7/8/2001		6/11/2001		6/29/2001		7/8/2001	
		SDGNumber		44280		43522		44280		44280	
PCB-1016 (Arochlor 1016)	ug/Kg	37.7	R	38	U	39.5	UJ	39.5	R		
PCB-1221 (Arochlor 1221)	ug/Kg	37.7	R	38	U	39.5	UJ	39.5	R		
PCB-1232 (Arochlor 1232)	ug/kg	37.7	R	38	U	39.5	UJ	39.5	R		
PCB-1242 (Arochlor 1242)	ug/Kg	37.7	R	38	U	39.5	UJ	39.5	R		
PCB-1248 (Arochlor 1248)	ug/kg	37.7	R	38	U	39.5	UJ	39.5	R		
PCB-1254 (Arochlor 1254)	ug/kg	6	R	460	=	80.2	UJ	10.4	R		
PCB-1260 (Arochlor 1260)	ug/Kg	76.5	R	117	=	15.6	J	48.9	R		

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Soil General Chemistry StationID		F620SB054		F620SB054		F620SB057		F620SB057		F620SB058	
SampleID		620SB05401 (0-1ft)		620SB05402 (3-5ft)		620SB05701 (0-1ft)		620SB05702 (3-5ft)		620SB05802 (3-5ft)	
DateCollected		11/26/2001		11/26/2001		11/26/2001		11/26/2001		11/26/2001	
DateExtracted											
DateAnalyzed		11/26/2001		11/26/2001		11/26/2001		11/26/2001		11/26/2001	
SDGNumber		52481		52481		52481		52481		52481	
Units											
Parameter											
pH	SU	5.8	J	6.18	J	6.95	J	6.57	J	5.06	J

Analytical Data Summary

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Soil General Chemistry StationID		F620SB059		F620SB062		F620SB062		F620SB063		F620SB063	
SampleID		620SB05901 (0-1ft)		620SB06201 (0-1ft)		620SB06202 (3-5ft)		620SB06301 (0-1ft)		620SB06302 (3-5ft)	
DateCollected		11/26/2001		2/7/2002		2/7/2002		2/7/2002		2/7/2002	
DateExtracted											
DateAnalyzed		11/26/2001		2/7/2002		2/7/2002		2/7/2002		2/7/2002	
SDGNumber		52481		55785		55785		55785		55785	
Parameter		Units									
pH		SU		4.85	J	8.83	=	8.46	=	4.92	=
										7.56	=

Analytical Data Summary

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Soil Metal	StationID	F620SB017		F620SB017		F620SB017		F620SB017		F620SB018	
	SampleID	620SB01701 (0-1ft)		620SB01701 (0-1ft)		620SB01703 (-ft)		620SB01703 (-ft)		620CB01801 (0-1ft)	
	DateCollected	6/6/2001		6/6/2001		6/6/2001		6/6/2001		6/6/2001	
	DateExtracted	6/17/2001		6/18/2001		6/17/2001		6/18/2001		6/17/2001	
	DateAnalyzed	6/18/2001		6/19/2001		6/18/2001		6/19/2001		6/18/2001	
	SDGNumber	43561		43561		43561		43561		43561	
Parameter	Units										
Aluminum	mg/Kg			8300	=			24700	=		
Antimony	mg/Kg			0.673	J			1.11	J		
Arsenic	mg/Kg			5.12	=			22	=		
Barium	mg/Kg			23.2	J			38.8	J		
Beryllium	mg/Kg			0.285	J			1.06	=		
Cadmium	mg/Kg			0.655	J			1.12	=		
Calcium	mg/Kg			5340	=			8710	=		
Chromium, Total	mg/Kg			20.6	=			44	=		
Cobalt	mg/Kg			1.91	J			8.1	J		
Copper	mg/Kg			31.1	J			57.5	J		
Iron	mg/Kg			8120	=			27700	=		
Lead	mg/kg			172	=			236	=		
Lead, SPLP	ug/L										
Lead, TCLP	ug/L										
Magnesium	mg/Kg			630	J			2510	J		
Manganese	mg/Kg			83.9	J			400	J		
Nickel	mg/Kg			6.52	J			16.8	=		
Potassium	mg/Kg			319	J			1230	J		
Selenium	mg/Kg			0.318	U			1.01	=		
Silver	mg/Kg			0.243	U			0.472	U		
Sodium	mg/Kg			57.2	UJ			128	J		
Thallium	mg/Kg			0.372	U			0.957	J		
Vanadium	mg/Kg			18.9	=			54	=		
Zinc	mg/Kg			213	=			457	=		
Mercury	mg/kg	3.78	=			4.32	=			4.84	=
Mercury, SPLP	ug/L										

Analytical Data Summary

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Soil Metal	StationID	F620SB018			F620SB018			F620SB018			F620SB018		
	SampleID	620CB01801 (0-1ft)			620SB01801 (0-1ft)			620SB01801 (0-1ft)			620SB01803 (-ft)		
	DateCollected	6/6/2001			6/6/2001			6/6/2001			6/6/2001		
	DateExtracted	6/18/2001			6/17/2001			6/18/2001			6/17/2001		
	DateAnalyzed	6/19/2001			6/18/2001			6/19/2001			6/18/2001		
	SDGNumber	43561			43561			43561			43561		
Parameter	Units												
Aluminum	mg/Kg	3520	=				2680	=				15300	=
Antimony	mg/Kg	59.8	J				48.5	J				2.09	J
Arsenic	mg/Kg	4.37	=				3.18	=				13.8	=
Barium	mg/Kg	61.4	J				76	J				48.1	J
Beryllium	mg/Kg	0.054	U				0.042	U				0.255	J
Cadmium	mg/Kg	0.109	U				0.09	U				0.066	U
Calcium	mg/Kg	1130	J				792	J				588	J
Chromium, Total	mg/Kg	8.6	=				8.73	=				31.5	=
Cobalt	mg/Kg	0.941	J				0.779	J				2.39	J
Copper	mg/Kg	12.3	J				10.2	J				35.2	J
Iron	mg/Kg	3780	=				2650	=				17500	=
Lead	mg/kg	14200	=				18400	=				1350	=
Lead, SPLP	ug/L												
Lead, TCLP	ug/L												
Magnesium	mg/Kg	246	J				195	J				1140	J
Manganese	mg/Kg	14.5	J				9.95	J				23.9	J
Nickel	mg/Kg	2.99	J				4.23	J				5.6	J
Potassium	mg/Kg	296	J				237	J				1500	J
Selenium	mg/Kg	0.329	U				0.334	U				0.53	J
Silver	mg/Kg	4.8	=				3.55	=				0.528	U
Sodium	mg/Kg	29.2	UJ				22.9	J				269	J
Thallium	mg/Kg	0.385	U				0.391	U				0.509	U
Vanadium	mg/Kg	8.68	J				6.99	J				25.7	=
Zinc	mg/Kg	25.1	=				27.4	=				11.6	=
Mercury	mg/kg				5.05	=				3.48	=		
Mercury, SPLP	ug/L												

Analytical Data Summary

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Soil Metal	StationID	F620SB022		F620SB022		F620SB022		F620SB022		F620SB023	
	SampleID	620SB02201 (0-1ft)		620SB02201 (0-1ft)		620SB02203 (2-3ft)		620SB02203 (2-3ft)		620CB02301 (0-1ft)	
	DateCollected	10/10/2001		10/10/2001		10/10/2001		10/10/2001		10/10/2001	
	DateExtracted	10/12/2101		10/15/2101		10/12/2101		10/15/2101		10/12/2101	
	DateAnalyzed	10/13/2001		10/17/2001		10/13/2001		10/17/2001		10/13/2001	
	SDGNumber	50283		50283		50283		50283		50283	
Parameter	Units										
Aluminum	mg/Kg										
Antimony	mg/Kg										
Arsenic	mg/Kg										
Barium	mg/Kg										
Beryllium	mg/Kg										
Cadmium	mg/Kg										
Calcium	mg/Kg										
Chromium, Total	mg/Kg										
Cobalt	mg/Kg										
Copper	mg/Kg										
Iron	mg/Kg										
Lead	mg/kg	25.4	=			157	=			33.4	=
Lead, SPLP	ug/L										
Lead, TCLP	ug/L										
Magnesium	mg/Kg										
Manganese	mg/Kg										
Nickel	mg/Kg										
Potassium	mg/Kg										
Selenium	mg/Kg										
Silver	mg/Kg										
Sodium	mg/Kg										
Thallium	mg/Kg										
Vanadium	mg/Kg										
Zinc	mg/Kg										
Mercury	mg/kg			0.066	J			0.101	J		
Mercury, SPLP	ug/L										

Analytical Data Summary

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Soil Metal	StationID	F620SB023	F620SB023	F620SB023	F620SB023	F620SB024
SampleID	620CB02301 (0-1ft)	620SB02301 (0-1ft)	620SB02301 (0-1ft)	620SB02303 (2-3ft)	620SB02401 (0-1ft)	
DateCollected	10/10/2001	10/10/2001	10/10/2001	10/10/2001	10/10/2001	
DateExtracted	10/15/2101	10/12/2101	10/15/2101	10/16/2001	10/16/2001	
DateAnalyzed	10/17/2001	10/13/2001	10/17/2001	10/17/2001	10/17/2001	
SDGNumber	50283	50283	50283	50283B	50283B	
Parameter	Units					
Aluminum	mg/Kg					
Antimony	mg/Kg					
Arsenic	mg/Kg					
Barium	mg/Kg					
Beryllium	mg/Kg					
Cadmium	mg/Kg					
Calcium	mg/Kg					
Chromium, Total	mg/Kg					
Cobalt	mg/Kg					
Copper	mg/Kg					
Iron	mg/Kg					
Lead	mg/kg	5.9	=	13.3	=	4.04
Lead, SPLP	ug/L					
Lead, TCLP	ug/L					
Magnesium	mg/Kg					
Manganese	mg/Kg					
Nickel	mg/Kg					
Potassium	mg/Kg					
Selenium	mg/Kg					
Silver	mg/Kg					
Sodium	mg/Kg					
Thallium	mg/Kg					
Vanadium	mg/Kg					
Zinc	mg/Kg					
Mercury	mg/kg	0.016	J	0.031	J	
Mercury, SPLP	ug/L					

Analytical Data Summary

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Soil Metal	StationID	F620SB024	F620SB025	F620SB026	F620SB026	F620SB027
	SampleID	620SB02403 (2-3ft)	620SB02501 (0-1ft)	620SB02601 (0-1ft)	620SB02603 (2-3ft)	620SB02701 (0-1ft)
	DateCollected	10/10/2001	10/10/2001	10/10/2001	10/10/2001	10/10/2001
	DateExtracted	10/16/2001	10/16/2001	10/16/2001	10/16/2001	10/16/2001
	DateAnalyzed	10/17/2001	10/17/2001	10/17/2001	10/17/2001	10/17/2001
	SDGNumber	50283B	50283B	50283B	50283B	50283B
Parameter	Units					
Aluminum	mg/Kg					
Antimony	mg/Kg					
Arsenic	mg/Kg					
Barium	mg/Kg					
Beryllium	mg/Kg					
Cadmium	mg/Kg					
Calcium	mg/Kg					
Chromium, Total	mg/Kg					
Cobalt	mg/Kg					
Copper	mg/Kg					
Iron	mg/Kg					
Lead	mg/kg	3.1	=	5.82	=	4.93
Lead, SPLP	ug/L					
Lead, TCLP	ug/L					
Magnesium	mg/Kg					
Manganese	mg/Kg					
Nickel	mg/Kg					
Potassium	mg/Kg					
Selenium	mg/Kg					
Silver	mg/Kg					
Sodium	mg/Kg					
Thallium	mg/Kg					
Vanadium	mg/Kg					
Zinc	mg/Kg					
Mercury	mg/kg					
Mercury, SPLP	ug/L					

Analytical Data Summary

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Soil Metal	StationID	F620SB027	F620SB028	F620SB028	F620SB029	F620SB029
SampleID	620SB02703 (2-3ft)	620SB02801 (0-1ft)	620SB02803 (2-3ft)	620SB02901 (0-1ft)	620SB02901 (0-1ft)	
DateCollected	10/10/2001	10/10/2001	10/10/2001	10/10/2001	10/10/2001	
DateExtracted	10/16/2001	10/16/2001	10/16/2001	10/12/2101	10/15/2101	
DateAnalyzed	10/17/2001	10/17/2001	10/17/2001	10/13/2001	10/17/2001	
SDGNumber	50283B	50283B	50283B	50283	50283	
Parameter	Units					
Aluminum	mg/Kg					
Antimony	mg/Kg					
Arsenic	mg/Kg					
Barium	mg/Kg					
Beryllium	mg/Kg					
Cadmium	mg/Kg					
Calcium	mg/Kg					
Chromium, Total	mg/Kg					
Cobalt	mg/Kg					
Copper	mg/Kg					
Iron	mg/Kg					
Lead	mg/kg	7.9	=	4.66	=	6.21
Lead, SPLP	ug/L					
Lead, TCLP	ug/L					
Magnesium	mg/Kg					
Manganese	mg/Kg					
Nickel	mg/Kg					
Potassium	mg/Kg					
Selenium	mg/Kg					
Silver	mg/Kg					
Sodium	mg/Kg					
Thallium	mg/Kg					
Vanadium	mg/Kg					
Zinc	mg/Kg					
Mercury	mg/kg					0.034
Mercury, SPLP	ug/L					J

Analytical Data Summary

02/17/2003 12:07 PM

Soil Metal	StationID	F620SB030		F620SB030		F620SB030		F620SB031		F620SB032	
	SampleID	620SB03001 (0-1ft)		620SB03001 (0-1ft)		620SB03001 (0-1ft)		620SB03101 (0-1ft)		620CB03203 (2-3ft)	
	DateCollected	10/10/2001		10/10/2001		10/10/2001		10/10/2001		10/10/2001	
	DateExtracted	10/12/2101		10/15/2101		10/22/2101		10/12/2101		10/12/2101	
	DateAnalyzed	10/13/2001		10/17/2001		10/26/2001		10/13/2001		10/13/2001	
	SDGNumber	50283		50283		50283		50283		50283	
Parameter	Units										
Aluminum	mg/Kg										
Antimony	mg/Kg										
Arsenic	mg/Kg										
Barium	mg/Kg										
Beryllium	mg/Kg										
Cadmium	mg/Kg										
Calcium	mg/Kg										
Chromium, Total	mg/Kg										
Cobalt	mg/Kg										
Copper	mg/Kg										
Iron	mg/Kg										
Lead	mg/kg	476	=					273	=	2050	=
Lead, SPLP	ug/L										
Lead, TCLP	ug/L										
Magnesium	mg/Kg										
Manganese	mg/Kg										
Nickel	mg/Kg										
Potassium	mg/Kg										
Selenium	mg/Kg										
Silver	mg/Kg										
Sodium	mg/Kg										
Thallium	mg/Kg										
Vanadium	mg/Kg										
Zinc	mg/Kg										
Mercury	mg/kg			1.68	J						
Mercury, SPLP	ug/L					0.642	U				

Analytic Data Summary

02/17/2012 12:07 PM

Soil Metal	StationID	F620SB032	F620SB032	F620SB032	F620SB033	F620SB033
SampleID	620SB03201 (0-1ft)	620SB03201 (0-1ft)	620SB03203 (2-3ft)	620SB03301 (0-1ft)	620SB03303 (2-3ft)	
DateCollected	10/10/2001	10/10/2001	10/10/2001	10/10/2001	10/10/2001	
DateExtracted	10/12/2101	10/22/2101	10/12/2101	10/12/2101	10/12/2101	
DateAnalyzed	10/13/2001	10/23/2001	10/13/2001	10/13/2001	10/13/2001	
SDGNumber	50283	50283	50283	50283	50283	
Parameter	Units					
Aluminum	mg/Kg					
Antimony	mg/Kg					
Arsenic	mg/Kg					
Barium	mg/Kg					
Beryllium	mg/Kg					
Cadmium	mg/Kg					
Calcium	mg/Kg					
Chromium, Total	mg/Kg					
Cobalt	mg/Kg					
Copper	mg/Kg					
Iron	mg/Kg					
Lead	mg/kg	1500	=	1120	=	430
Lead, SPLP	ug/L			1730	=	416
Lead, TCLP	ug/L					
Magnesium	mg/Kg					
Manganese	mg/Kg					
Nickel	mg/Kg					
Potassium	mg/Kg					
Selenium	mg/Kg					
Silver	mg/Kg					
Sodium	mg/Kg					
Thallium	mg/Kg					
Vanadium	mg/Kg					
Zinc	mg/Kg					
Mercury	mg/kg					
Mercury, SPLP	ug/L					

Analytical Data Summary

02/17/2003 12:07 PM

Soil Metal	StationID	F620SB033	F620SB034	F620SB034	F620SB034	F620SB034
	SampleID	620SB03303 (2-3ft)	620SB03401 (0-1ft)	620SB03401 (0-1ft)	620SB03401 (0-1ft)	620SB03403 (2-3ft)
	DateCollected	10/10/2001	10/10/2001	10/10/2001	10/10/2001	10/10/2001
	DateExtracted	10/22/2101	10/12/2101	10/15/2101	10/22/2101	10/12/2101
	DateAnalyzed	10/23/2001	10/13/2001	10/17/2001	10/26/2001	10/13/2001
	SDGNumber	50283	50283	50283	50283	50283
Parameter	Units					
Aluminum	mg/Kg					
Antimony	mg/Kg					
Arsenic	mg/Kg					
Barium	mg/Kg					
Beryllium	mg/Kg					
Cadmium	mg/Kg					
Calcium	mg/Kg					
Chromium, Total	mg/Kg					
Cobalt	mg/Kg					
Copper	mg/Kg					
Iron	mg/Kg					
Lead	mg/kg		106	=		1100
Lead, SPLP	ug/L	1590	=			
Lead, TCLP	ug/L					
Magnesium	mg/Kg					
Manganese	mg/Kg					
Nickel	mg/Kg					
Potassium	mg/Kg					
Selenium	mg/Kg					
Silver	mg/Kg					
Sodium	mg/Kg					
Thallium	mg/Kg					
Vanadium	mg/Kg					
Zinc	mg/Kg					
Mercury	mg/kg			0.361	J	
Mercury, SPLP	ug/L				0.642	U

Analytical Data Summary

02/17/2001 12:07 PM

Soil Metal	StationID	F620SB034	F620SB034	F620SB034	F620SB035	F620SB035
SampleID	620SB03403 (2-3ft)	620SB03403 (2-3ft)	620SB03403 (2-3ft)	620SB03501 (0-1ft)	620SB03501 (0-1ft)	620SB03501 (0-1ft)
DateCollected	10/10/2001	10/10/2001	10/10/2001	10/10/2001	10/10/2001	10/10/2001
DateExtracted	10/15/2101	10/22/2101	10/22/2101	10/12/2101	10/22/2101	10/22/2101
DateAnalyzed	10/17/2001	10/23/2001	10/26/2001	10/13/2001	10/23/2001	10/23/2001
SDGNumber	50283	50283	50283	50283	50283	50283
Parameter	Units					
Aluminum	mg/Kg					
Antimony	mg/Kg					
Arsenic	mg/Kg					
Barium	mg/Kg					
Beryllium	mg/Kg					
Cadmium	mg/Kg					
Calcium	mg/Kg					
Chromium, Total	mg/Kg					
Cobalt	mg/Kg					
Copper	mg/Kg					
Iron	mg/Kg					
Lead	mg/kg				770	=
Lead, SPLP	ug/L		2740	=		40.4 J
Lead, TCLP	ug/L					
Magnesium	mg/Kg					
Manganese	mg/Kg					
Nickel	mg/Kg					
Potassium	mg/Kg					
Selenium	mg/Kg					
Silver	mg/Kg					
Sodium	mg/Kg					
Thallium	mg/Kg					
Vanadium	mg/Kg					
Zinc	mg/Kg					
Mercury	mg/kg	0.576	J			
Mercury, SPLP	ug/L			4.22	=	

Analytical Data Summary

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Soil Metal	StationID	F620SB035		F620SB036		F620SB036		F620SB036		F620SB037	
	SampleID	620SB03503 (2-3ft)		620SB03601 (0-1ft)		620SB03603 (2-3ft)		620SB03603 (2-3ft)		620SB03701 (0-1ft)	
	DateCollected	10/10/2001		10/10/2001		10/10/2001		10/10/2001		10/10/2001	
	DateExtracted	10/12/2101		10/12/2101		10/12/2101		10/22/2101		10/12/2101	
	DateAnalyzed	10/13/2001		10/13/2001		10/13/2001		10/23/2001		10/13/2001	
	SDGNumber	50283		50283		50283		50283		50283	
Parameter	Units										
Aluminum	mg/Kg										
Antimony	mg/Kg										
Arsenic	mg/Kg										
Barium	mg/Kg										
Beryllium	mg/Kg										
Cadmium	mg/Kg										
Calcium	mg/Kg										
Chromium, Total	mg/Kg										
Cobalt	mg/Kg										
Copper	mg/Kg										
Iron	mg/Kg										
Lead	mg/kg	303	=	570	=	3880	=			2360	=
Lead, SPLP	ug/L							24.3	U		
Lead, TCLP	ug/L										
Magnesium	mg/Kg										
Manganese	mg/Kg										
Nickel	mg/Kg										
Potassium	mg/Kg										
Selenium	mg/Kg										
Silver	mg/Kg										
Sodium	mg/Kg										
Thallium	mg/Kg										
Vanadium	mg/Kg										
Zinc	mg/Kg										
Mercury	mg/kg										
Mercury, SPLP	ug/L										

Analytical Data Summary

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Soil Metal	StationID	F620SB037	F620SB037	F620SB038	F620SB038	F620SB038
SampleID	620SB03703 (2-3ft)	620SB03703 (2-3ft)	620SB03801 (0-1ft)	620SB03803 (2-3ft)	620SB03803 (2-3ft)	620SB03803 (2-3ft)
DateCollected	10/10/2001	10/10/2001	10/10/2001	10/10/2001	10/10/2001	10/10/2001
DateExtracted	10/12/2101	10/22/2101	10/16/2001	10/16/2001	10/16/2001	10/22/2001
DateAnalyzed	10/13/2001	10/23/2001	10/17/2001	10/17/2001	10/17/2001	10/23/2001
SDGNumber	50283	50283	50283B	50283B	50283B	50283B
Parameter	Units					
Aluminum	mg/Kg					
Antimony	mg/Kg					
Arsenic	mg/Kg					
Barium	mg/Kg					
Beryllium	mg/Kg					
Cadmium	mg/Kg					
Calcium	mg/Kg					
Chromium, Total	mg/Kg					
Cobalt	mg/Kg					
Copper	mg/Kg					
Iron	mg/Kg					
Lead	mg/kg	497	=	952	=	3270
Lead, SPLP	ug/L					
Lead, TCLP	ug/L					
Magnesium	mg/Kg					
Manganese	mg/Kg					
Nickel	mg/Kg					
Potassium	mg/Kg					
Selenium	mg/Kg					
Silver	mg/Kg					
Sodium	mg/Kg					
Thallium	mg/Kg					
Vanadium	mg/Kg					
Zinc	mg/Kg					
Mercury	mg/kg					
Mercury, SPLP	ug/L					

Analytical Data Summary

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Soil Metal	StationID	F620SB039		F620SB039		F620SB039		F620SB040		F620SB040	
	SampleID	620CB03901 (0-1ft)		620SB03901 (0-1ft)		620SB03903 (2-3ft)		620SB04001 (0-1ft)		620SB04003 (2-3ft)	
	DateCollected	10/10/2001		10/10/2001		10/10/2001		10/10/2001		10/10/2001	
	DateExtracted	10/16/2001		10/16/2001		10/16/2001		10/16/2001		10/16/2001	
	DateAnalyzed	10/17/2001		10/17/2001		10/17/2001		10/17/2001		10/17/2001	
	SDGNumber	50283B		50283B		50283B		50283B		50283B	
Parameter	Units										
Aluminum	mg/Kg										
Antimony	mg/Kg										
Arsenic	mg/Kg										
Barium	mg/Kg										
Beryllium	mg/Kg										
Cadmium	mg/Kg										
Calcium	mg/Kg										
Chromium, Total	mg/Kg										
Cobalt	mg/Kg										
Copper	mg/Kg										
Iron	mg/Kg										
Lead	mg/kg	83.2	=	145	=	242	=	93.5	=	57.6	=
Lead, SPLP	ug/L										
Lead, TCLP	ug/L										
Magnesium	mg/Kg										
Manganese	mg/Kg										
Nickel	mg/Kg										
Potassium	mg/Kg										
Selenium	mg/Kg										
Silver	mg/Kg										
Sodium	mg/Kg										
Thallium	mg/Kg										
Vanadium	mg/Kg										
Zinc	mg/Kg										
Mercury	mg/kg										
Mercury, SPLP	ug/L										

Soil Metal

Soil Metal	StationID	F620SB041		F620SB041		F620SB042		F620SB042		F620SB043	
	SampleID	620SB04101 (0-1ft)		620SB04103 (2-3ft)		620SB04201 (0-1ft)		620SB04203 (2-3ft)		620SB04301 (0-1ft)	
	DateCollected	10/10/2001		10/10/2001		10/10/2001		10/10/2001		10/10/2001	
	DateExtracted	10/16/2001		10/16/2001		10/16/2001		10/16/2001		10/16/2001	
	DateAnalyzed	10/17/2001		10/17/2001		10/17/2001		10/17/2001		10/17/2001	
	SDGNumber	50283B		50283B		50283B		50283C		50283C	
Parameter	Units										
Aluminum	mg/Kg										
Antimony	mg/Kg										
Arsenic	mg/Kg										
Barium	mg/Kg										
Beryllium	mg/Kg										
Cadmium	mg/Kg										
Calcium	mg/Kg										
Chromium, Total	mg/Kg										
Cobalt	mg/Kg										
Copper	mg/Kg										
Iron	mg/Kg										
Lead	mg/kg	737	=	94.8	=	2.81	=	295	=	632	=
Lead, SPLP	ug/L										
Lead, TCLP	ug/L										
Magnesium	mg/Kg										
Manganese	mg/Kg										
Nickel	mg/Kg										
Potassium	mg/Kg										
Selenium	mg/Kg										
Silver	mg/Kg										
Sodium	mg/Kg										
Thallium	mg/Kg										
Vanadium	mg/Kg										
Zinc	mg/Kg										
Mercury	mg/kg										
Mercury, SPLP	ug/L										

Analytical Data Summary

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Soil Metal	StationID	F620SB043		F620SB043		F620SB044		F620SB044		F620SB045	
	SampleID	620SB04301 (0-1ft)		620SB04303 (2-3ft)		620SB04401 (0-1ft)		620SB04403 (2-3ft)		620SB04501 (0-1ft)	
	DateCollected	10/10/2001		10/10/2001		10/10/2001		10/10/2001		10/10/2001	
	DateExtracted	10/22/2001		10/16/2001		10/16/2001		10/16/2001		10/16/2001	
	DateAnalyzed	10/23/2001		10/17/2001		10/17/2001		10/17/2001		10/17/2001	
	SDGNumber	50283C		50283C		50283C		50283C		50283C	
Parameter	Units										
Aluminum	mg/Kg										
Antimony	mg/Kg										
Arsenic	mg/Kg										
Barium	mg/Kg										
Beryllium	mg/Kg										
Cadmium	mg/Kg										
Calcium	mg/Kg										
Chromium, Total	mg/Kg										
Cobalt	mg/Kg										
Copper	mg/Kg										
Iron	mg/Kg										
Lead	mg/kg			736	=	224	=	376	=	239	=
Lead, SPLP	ug/L	61.1	J								
Lead, TCLP	ug/L										
Magnesium	mg/Kg										
Manganese	mg/Kg										
Nickel	mg/Kg										
Potassium	mg/Kg										
Selenium	mg/Kg										
Silver	mg/Kg										
Sodium	mg/Kg										
Thallium	mg/Kg										
Vanadium	mg/Kg										
Zinc	mg/Kg										
Mercury	mg/kg										
Mercury, SPLP	ug/L										

Soil Metal	StationID	F620SB045		F620SB046		F620SB046		F620SB046		F620SB053	
	SampleID	620SB04503 (2-3ft)		620CB04603 (2-3ft)		620SB04601 (0-1ft)		620SB04603 (2-3ft)		620CB05302 (3-5ft)	
	DateCollected	10/10/2001		10/10/2001		10/10/2001		10/10/2001		11/26/2001	
	DateExtracted	10/16/2001		10/16/2001		10/16/2001		10/16/2001		11/28/2001	
	DateAnalyzed	10/17/2001		10/17/2001		10/17/2001		10/17/2001		11/29/2001	
	SDGNumber	50283C		50283C		50283C		50283C		52481	
Parameter	Units										
Aluminum	mg/Kg										
Antimony	mg/Kg										
Arsenic	mg/Kg										
Barium	mg/Kg										
Beryllium	mg/Kg										
Cadmium	mg/Kg										
Calcium	mg/Kg										
Chromium, Total	mg/Kg										
Cobalt	mg/Kg										
Copper	mg/Kg										
Iron	mg/Kg										
Lead	mg/kg	159	=	153	=	195	=	137	=	97.1	=
Lead, SPLP	ug/L										
Lead, TCLP	ug/L										
Magnesium	mg/Kg										
Manganese	mg/Kg										
Nickel	mg/Kg										
Potassium	mg/Kg										
Selenium	mg/Kg										
Silver	mg/Kg										
Sodium	mg/Kg										
Thallium	mg/Kg										
Vanadium	mg/Kg										
Zinc	mg/Kg										
Mercury	mg/kg										
Mercury, SPLP	ug/L										

Analytical Data Summary

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Soil Metal	StationID	F620SB053		F620SB053		F620SB053		F620SB053		F620SB053	
	SampleID	620CB05302 (3-5ft)		620CB05302 (3-5ft)		620SB05301 (0-1ft)		620SB05301 (0-1ft)		620SB05301 (0-1ft)	
	DateCollected	11/26/2001		11/26/2001		11/26/2001		11/26/2001		11/26/2001	
	DateExtracted	11/29/2001		11/29/2001		11/28/2001		11/29/2001		11/29/2001	
	DateAnalyzed	11/30/2001		11/30/2001		11/29/2001		11/30/2001		11/30/2001	
	SDGNumber	52481B		52481		52481		52481B		52481	
Parameter	Units										
Aluminum	mg/Kg										
Antimony	mg/Kg										
Arsenic	mg/Kg										
Barium	mg/Kg										
Beryllium	mg/Kg										
Cadmium	mg/Kg										
Calcium	mg/Kg										
Chromium, Total	mg/Kg										
Cobalt	mg/Kg										
Copper	mg/Kg										
Iron	mg/Kg										
Lead	mg/kg					153	=				
Lead, SPLP	ug/L										
Lead, TCLP	ug/L	30.3	J					33.4	J		
Magnesium	mg/Kg										
Manganese	mg/Kg										
Nickel	mg/Kg										
Potassium	mg/Kg										
Selenium	mg/Kg										
Silver	mg/Kg										
Sodium	mg/Kg										
Thallium	mg/Kg										
Vanadium	mg/Kg										
Zinc	mg/Kg										
Mercury	mg/kg			1.61	=					1.06	=
Mercury, SPLP	ug/L										

Analytical Data Summary

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Soil Metal	StationID	F620SB053	F620SB053	F620SB053	F620SB054	F620SB054
SampleID	620SB05302 (3-5ft)	620SB05302 (3-5ft)	620SB05302 (3-5ft)	620SB05401 (0-1ft)	620SB05401 (0-1ft)	620SB05401 (0-1ft)
DateCollected	11/26/2001	11/26/2001	11/26/2001	11/26/2001	11/26/2001	11/26/2001
DateExtracted	11/28/2001	11/29/2001	11/29/2001	11/28/2001	12/1/2001	12/1/2001
DateAnalyzed	11/29/2001	11/30/2001	11/30/2001	11/29/2001	12/2/2001	12/2/2001
SDGNumber	52481	52481B	52481	52481	52481B	52481B
Parameter	Units					
Aluminum	mg/Kg					
Antimony	mg/Kg					
Arsenic	mg/Kg					
Barium	mg/Kg					
Beryllium	mg/Kg					
Cadmium	mg/Kg					
Calcium	mg/Kg					
Chromium, Total	mg/Kg					
Cobalt	mg/Kg					
Copper	mg/Kg					
Iron	mg/Kg					
Lead	mg/kg	97.8	=		1820	=
Lead, SPLP	ug/L					
Lead, TCLP	ug/L		26.8	J		31200 =
Magnesium	mg/Kg					
Manganese	mg/Kg					
Nickel	mg/Kg					
Potassium	mg/Kg					
Selenium	mg/Kg					
Silver	mg/Kg					
Sodium	mg/Kg					
Thallium	mg/Kg					
Vanadium	mg/Kg					
Zinc	mg/Kg					
Mercury	mg/kg			1.42	=	
Mercury, SPLP	ug/L					

Analytical Data Summary

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Soil Metal	StationID	F620SB054		F620SB054		F620SB055		F620SB055		F620SB055	
	SampleID	620SB05402 (3-5ft)		620SB05402 (3-5ft)		620SB05501 (0-1ft)		620SB05501 (0-1ft)		620SB05502 (3-5ft)	
	DateCollected	11/26/2001		11/26/2001		11/26/2001		11/26/2001		11/26/2001	
	DateExtracted	11/28/2001		12/1/2001		11/28/2001		11/29/2001		11/28/2001	
	DateAnalyzed	11/29/2001		12/2/2001		11/29/2001		11/30/2001		11/29/2001	
	SDGNumber	52481		52481B		52481		52481B		52481	
Parameter	Units										
Aluminum	mg/Kg										
Antimony	mg/Kg										
Arsenic	mg/Kg										
Barium	mg/Kg										
Beryllium	mg/Kg										
Cadmium	mg/Kg										
Calcium	mg/Kg										
Chromium, Total	mg/Kg										
Cobalt	mg/Kg										
Copper	mg/Kg										
Iron	mg/Kg										
Lead	mg/kg	961	=			3.05	=			63.1	=
Lead, SPLP	ug/L										
Lead, TCLP	ug/L			743	=			24.8	J		
Magnesium	mg/Kg										
Manganese	mg/Kg										
Nickel	mg/Kg										
Potassium	mg/Kg										
Selenium	mg/Kg										
Silver	mg/Kg										
Sodium	mg/Kg										
Thallium	mg/Kg										
Vanadium	mg/Kg										
Zinc	mg/Kg										
Mercury	mg/kg										
Mercury, SPLP	ug/L										

Soil Metal	StationID	F620SB055	F620SB056	F620SB056	F620SB056	F620SB056
SampleID	620SB05502 (3-5ft)	620SB05601 (0-1ft)	620SB05601 (0-1ft)	620SB05602 (3-5ft)	620SB05602 (3-5ft)	620SB05602 (3-5ft)
DateCollected	11/26/2001	11/26/2001	11/26/2001	11/26/2001	11/26/2001	11/26/2001
DateExtracted	11/29/2001	11/28/2001	11/29/2001	11/28/2001	11/29/2001	11/29/2001
DateAnalyzed	11/30/2001	11/29/2001	11/30/2001	11/29/2001	11/30/2001	11/30/2001
SDGNumber	52481B	52481	52481B	52481	52481B	52481B
Parameter	Units					
Aluminum	mg/Kg					
Antimony	mg/Kg					
Arsenic	mg/Kg					
Barium	mg/Kg					
Beryllium	mg/Kg					
Cadmium	mg/Kg					
Calcium	mg/Kg					
Chromium, Total	mg/Kg					
Cobalt	mg/Kg					
Copper	mg/Kg					
Iron	mg/Kg					
Lead	mg/kg		2.67	=		2.66
Lead, SPLP	ug/L					
Lead, TCLP	ug/L	28.4	J		24.3	U
Magnesium	mg/Kg					
Manganese	mg/Kg					
Nickel	mg/Kg					
Potassium	mg/Kg					
Selenium	mg/Kg					
Silver	mg/Kg					
Sodium	mg/Kg					
Thallium	mg/Kg					
Vanadium	mg/Kg					
Zinc	mg/Kg					
Mercury	mg/kg					
Mercury, SPLP	ug/L					

Analytical Data Summary

02/17/2003 12:07 PM

Soil Metal	StationID	F620SB057		F620SB057		F620SB057		F620SB057		F620SB058	
	SampleID	620SB05701 (0-1ft)		620SB05701 (0-1ft)		620SB05702 (3-5ft)		620SB05702 (3-5ft)		620SB05802 (3-5ft)	
	DateCollected	11/26/2001		11/26/2001		11/26/2001		11/26/2001		11/26/2001	
	DateExtracted	11/28/2001		12/1/2001		11/28/2001		12/1/2001		12/1/2001	
	DateAnalyzed	11/29/2001		12/2/2001		11/29/2001		12/2/2001		12/2/2001	
	SDGNumber	52481		52481B		52481		52481B		52481B	
Parameter	Units										
Aluminum	mg/Kg										
Antimony	mg/Kg										
Arsenic	mg/Kg										
Barium	mg/Kg										
Beryllium	mg/Kg										
Cadmium	mg/Kg										
Calcium	mg/Kg										
Chromium, Total	mg/Kg										
Cobalt	mg/Kg										
Copper	mg/Kg										
Iron	mg/Kg										
Lead	mg/kg	790	=			317	=				
Lead, SPLP	ug/L										
Lead, TCLP	ug/L			273	J			84	J	1980	=
Magnesium	mg/Kg										
Manganese	mg/Kg										
Nickel	mg/Kg										
Potassium	mg/Kg										
Selenium	mg/Kg										
Silver	mg/Kg										
Sodium	mg/Kg										
Thallium	mg/Kg										
Vanadium	mg/Kg										
Zinc	mg/Kg										
Mercury	mg/kg										
Mercury, SPLP	ug/L										

Analytical Data Summary

02/17/2006 12:07 PM

Soil Metal	StationID	F620SB059	F620SB060	F620SB060
SampleID	620SB05901 (0-1ft)	620SB06001 (0-1ft)	620SB06002 (3-5ft)	
DateCollected	11/26/2001	11/26/2001	11/26/2001	
DateExtracted	12/1/2001	11/28/2001	11/28/2001	
DateAnalyzed	12/3/2001	11/29/2001	11/29/2001	
SDGNumber	52481B	52481	52481	
Parameter	Units			
Aluminum	mg/Kg			
Antimony	mg/Kg			
Arsenic	mg/Kg			
Barium	mg/Kg			
Beryllium	mg/Kg			
Cadmium	mg/Kg			
Calcium	mg/Kg			
Chromium, Total	mg/Kg			
Cobalt	mg/Kg			
Copper	mg/Kg			
Iron	mg/Kg			
Lead	mg/kg		406 =	40.7 =
Lead, SPLP	ug/L			
Lead, TCLP	ug/L	24.3 U		
Magnesium	mg/Kg			
Manganese	mg/Kg			
Nickel	mg/Kg			
Potassium	mg/Kg			
Selenium	mg/Kg			
Silver	mg/Kg			
Sodium	mg/Kg			
Thallium	mg/Kg			
Vanadium	mg/Kg			
Zinc	mg/Kg			
Mercury	mg/kg			
Mercury, SPLP	ug/L			

Analytical Data Summary

02/17/2003 12:07 PM

Soil Metal	StationID	F620SB061		F620SB062		F620SB062		F620SB063	
	SampleID	620SB06101 (0-1ft)		620SB06102 (3-5ft)		620SB06201 (0-1ft)		620SB06202 (3-5ft)	
	DateCollected	2/7/2002		2/7/2002		2/7/2002		2/7/2002	
	DateExtracted	2/11/2002		2/11/2002		2/11/2002		2/11/2002	
	DateAnalyzed	2/13/2002		2/13/2002		2/13/2002		2/13/2002	
SDGNumber		55785		55785		55785		55785	
Parameter	Units								
Arsenic, TCLP	mg/l								
Barium, TCLP	mg/l								
Cadmium, TCLP	mg/l								
Chromium, TCLP	mg/l								
Lead	mg/kg	39	=	33.7	=	94.1	=	66.9	=
Lead, TCLP	mg/l								
Selenium, TCLP	mg/l								
Silver, TCLP	mg/l								
Mercury, TCLP	mg/l								

Analytical Data Summary

02/17/2002 12:07 PM

Soil Metal

Soil Metal	StationID	F620SB063		F620SB064		F620SB064		F620SB064		F620SB065	
	SampleID	620SB06302 (3-5ft)		620CB06402 (3-5ft)		620SB06401 (0-1ft)		620SB06402 (3-5ft)		620SB06501 (0-1ft)	
	DateCollected	2/7/2002		2/7/2002		2/7/2002		2/7/2002		2/7/2002	
	DateExtracted	2/11/2002		2/11/2002		2/11/2002		2/11/2002		2/11/2002	
	DateAnalyzed	2/13/2002		2/13/2002		2/13/2002		2/13/2002		2/13/2002	
	SDGNumber	55785		55785		55785		55785		55785	
Parameter	Units										
Arsenic, TCLP	mg/l										
Barium, TCLP	mg/l										
Cadmium, TCLP	mg/l										
Chromium, TCLP	mg/l										
Lead	mg/kg	106	=	60.1	=	209	=	14.8	=	3.26	=
Lead, TCLP	mg/l										
Selenium, TCLP	mg/l										
Silver, TCLP	mg/l										
Mercury, TCLP	mg/l										

Analytical Data Summary

02/17/2003 12:07 PM

Soil Metal	StationID	F620SB065		F620SB066		F620SB066		F620SB067		F620SB067	
	SampleID	620SB06502 (3-5ft)		620SB06601 (0-1ft)		620SB06602 (3-5ft)		620SB06701 (0-1ft)		620SB06702 (3-5ft)	
	DateCollected	2/7/2002		2/7/2002		2/7/2002		2/7/2002		2/7/2002	
	DateExtracted	2/11/2002		2/11/2002		2/11/2002		2/11/2002		2/11/2002	
	DateAnalyzed	2/13/2002		2/13/2002		2/13/2002		2/13/2002		2/13/2002	
	SDGNumber	55785		55785		55785		55785		55785	
Parameter	Units										
Arsenic, TCLP	mg/l										
Barium, TCLP	mg/l										
Cadmium, TCLP	mg/l										
Chromium, TCLP	mg/l										
Lead	mg/kg	4.92	=	5.93	=	11.4	=	4.18	=	6.76	=
Lead, TCLP	mg/l										
Selenium, TCLP	mg/l										
Silver, TCLP	mg/l										
Mercury, TCLP	mg/l										

Soil Metal	StationID	F620VA001		F620VA001		F620VA002		F620VA002		F620VA003	
	SampleID	620VA001M1 (-ft)		620VA001M1 (-ft)		620VA002M1 (-ft)		620VA002M1 (-ft)		620VA003M1 (-ft)	
	DateCollected	3/7/2002		3/7/2002		3/7/2002		3/7/2002		3/7/2002	
	DateExtracted	3/12/2002		3/12/2002		3/12/2002		3/12/2002		3/12/2002	
	DateAnalyzed	3/13/2002		3/12/2002		3/13/2002		3/12/2002		3/13/2002	
	SDGNumber	CNC74		CNC74		CNC74		CNC74		CNC74	
Parameter	Units										
Arsenic, TCLP	mg/l	0.053	U			0.053	U			0.053	U
Barium, TCLP	mg/l	0.29	J			0.34	J			0.26	J
Cadmium, TCLP	mg/l	0.0071	U			0.0078	U			0.0071	U
Chromium, TCLP	mg/l	0.017	U			0.017	U			0.017	U
Lead	mg/kg										
Lead, TCLP	mg/l	3.9	=			27	=			40	=
Selenium, TCLP	mg/l	0.042	U			0.042	U			0.042	U
Silver, TCLP	mg/l	0.019	U			0.019	U			0.019	U
Mercury, TCLP	mg/l			0.0072	U			0.0072	U		

Analytical Data Summary

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Soil Metal	StationID	F620VA003		F620VA004		F620VA004	
	SampleID	620VA003M1 (-ft)		620VA004M1 (-ft)		620VA004M1 (-ft)	
	DateCollected	3/7/2002		3/7/2002		3/7/2002	
	DateExtracted	3/12/2002		3/12/2002		3/12/2002	
	DateAnalyzed	3/12/2002		3/13/2002		3/12/2002	
	SDGNumber	CNC74		CNC74		CNC74	
Parameter	Units						
Arsenic, TCLP	mg/l			0.053	U		
Barium, TCLP	mg/l			0.2	J		
Cadmium, TCLP	mg/l			0.014	U		
Chromium, TCLP	mg/l			0.017	U		
Lead	mg/kg						
Lead, TCLP	mg/l			9.2	=		
Selenium, TCLP	mg/l			0.042	U		
Silver, TCLP	mg/l			0.019	U		
Mercury, TCLP	mg/l	0.0072	U			0.0072	U

Analytical Data Summary

02/17/2006 2:09 PM

Soil Metal	StationID	F620SB068		F620SB069		F620SB070		F620SB071	
	SampleID	620SB06801 (0-1ft)		620SB06901 (0-1ft)		620SB07001 (0-1ft)		620CB07101 (0-1ft)	
	DateCollected	11/22/2002		11/22/2002		11/22/2002		11/22/2002	
	DateExtracted	11/26/2002		11/26/2002		11/26/2002		11/26/2002	
	DateAnalyzed	11/27/2002		11/27/2002		11/27/2002		11/27/2002	
	SDGNumber	CNC150		CNC150		CNC150		CNC150	
Parameter	Units								
Lead	mg/kg	110	J	160	J	180	J	140	J

Analytical Data Summary

02/17/2003 12:09 PM

Soil Metal	StationID	F620SB071		F620SB072		F620SB073		F620SB073	
	SampleID	620SB07101 (0-1ft)		620SB07201 (0-1ft)		620SB07301 (0-1ft)		620SB07303 (1-2ft)	
	DateCollected	11/22/2002		12/2/2002		1/8/2003		1/8/2003	
	DateExtracted	11/26/2002		12/3/2002		1/9/2003		1/9/2003	
	DateAnalyzed	11/27/2002		12/5/2002		1/10/2003		1/10/2003	
	SDGNumber	CNC150		71384		73061		73061	
Parameter	Units								
Lead	mg/kg	1100	J	156	=	111	=	395	=

Analytical Data Summary

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Soil Metal	StationID	F620SB074		F620SB074		F620SB074		F620SB075	
	SampleID	620CB07403 (1-2ft)		620SB07401 (0-1ft)		620SB07403 (1-2ft)		620SB07501 (0-1ft)	
	DateCollected	1/8/2003		1/8/2003		1/8/2003		1/8/2003	
	DateExtracted	1/9/2003		1/9/2003		1/9/2003		1/9/2003	
	DateAnalyzed	1/10/2003		1/10/2003		1/10/2003		1/10/2003	
	SDGNumber	73061		73061		73061		73061	
Parameter	Units								
Lead	mg/kg	396	=	1410	=	2440	=	193	=

Analytical Data Summary

02/17/2003 12:09 PM

Soil Metal	StationID	F620SB075		F620SB076		F620SB076	
	SampleID	620SB07503 (1-2ft)		620SB07601 (0-1ft)		620SB07603 (1-2ft)	
	DateCollected	1/8/2003		1/8/2003		1/8/2003	
	DateExtracted	1/9/2003		1/9/2003		1/9/2003	
	DateAnalyzed	1/10/2003		1/10/2003		1/10/2003	
	SDGNumber	73061		73061		73061	
Parameter	Units						
Lead	mg/kg	3760	=	419	=	1230	=

Location 620SB008

Sample No.	Parameter	Soil		
		Concentration	Qualifier	Unit
620SB008T1 surface	Ag	0.05	U	MG/KG
	Al	6750.00	=	MG/KG
	As	15.10	J	MG/KG
	Ba	27.20	=	MG/KG
	Be	0.31	J	MG/KG
	Ca	39600.00	J	MG/KG
	Cd	0.29	J	MG/KG
	Co	3.20	J	MG/KG
	Cr	32.80	J	MG/KG
	Cu	46.30	=	MG/KG
	Fe	8790.00	=	MG/KG
	Hg	0.38	=	MG/KG
	K	698.00	J	MG/KG
	Mg	1310.00	J	MG/KG
	Mn	110.00	=	MG/KG
	Na	270.00	J	MG/KG
	Ni	11.40	=	MG/KG
	Pb	89.00	=	MG/KG
	Sb	1.70	J	MG/KG
	Se	0.80	J	MG/KG
	Sn	7.30	J	MG/KG
	Tl	0.24	UJ	MG/KG
	V	17.50	=	MG/KG
	Zn	145.00	J	MG/KG
	Methylene Chloride	0.02	U	MG/KG
620SB008T2 subsurface	Ag	0.05	U	MG/KG
	Al	16000.00	=	MG/KG
	As	18.90	=	MG/KG
	Ba	139.00	=	MG/KG
	Be	0.47	J	MG/KG
	Ca	14000.00	J	MG/KG
	Cd	0.43	J	MG/KG
	Co	4.80	J	MG/KG

Sample No.	Parameter	SPLP Leachate		
		Concentration	Qualifier	Unit
620SB008S1 surface	Ag	0.5	UJ	UG/L
	Al	749.0	=	UG/L
	As	27.4	=	UG/L
	Ba	128.0	J	UG/L
	Be	0.9	U	UG/L
	Ca	10500.0	=	UG/L
	Cd	0.3	U	UG/L
	Co	0.5	UJ	UG/L
	Cr	4.1	J	UG/L
	Cu	5.6	J	UG/L
	Fe	992.0	=	UG/L
	Hg	0.4	R	UG/L
	K	751.0	J	UG/L
	Mg	594.0	J	UG/L
	Mn	6.6	J	UG/L
	Na	963.0	J	UG/L
	Ni	2.5	J	UG/L
	Pb	8.9	U	UG/L
	Sb	2.4	U	UG/L
	Se	1.7	U	UG/L
	Sn	4.0	J	UG/L
	Tl	2.4	UJ	UG/L
	V	9.4	J	UG/L
	Zn	40.9	=	UG/L
	Methylene Chloride	30.0	J	UG/L
620SB008S2 subsurface	Ag	0.5	U	UG/L
	Al	5990.0	J	UG/L
	As	4.2	J	UG/L
	Ba	422.0	=	UG/L
	Be	0.9	U	UG/L
	Ca	23800.0	=	UG/L
	Cd	0.5	U	UG/L
	Co	0.5	UJ	UG/L

AOC 620 SPLP Results

Location 620SB008

Soil				
Sample No.	Parameter	Concentration	Qualifier	Unit
	Cr	269.00	J	MG/KG
	Cu	66.80	J	MG/KG
	Fe	19200.00	J	MG/KG
	Hg	0.70	=	MG/KG
	K	1390.00	J	MG/KG
	Mg	2220.00	J	MG/KG
	Mn	401.00	J	MG/KG
	Na	325.00	J	MG/KG
	Ni	9.90	J	MG/KG
	Pb	105.00	J	MG/KG
	Sb	2.50	J	MG/KG
	Se	1.70	=	MG/KG
	Sn	5.90	U	MG/KG
	Tl	1.30	UJ	MG/KG
	V	36.40	=	MG/KG
	Zn	422.00	J	MG/KG
	Methylene Chloride	0.011	U	MG/KG
	Acenaphthene	0.71	=	MG/KG

SPLP Leachate				
Sample No.	Parameter	Concentration	Qualifier	Unit
	Cr	16.7	=	UG/L
	Cu	8.0	J	UG/L
	Fe	3890.0	J	UG/L
	Hg	0.4	U	UG/L
	K	4040.0	J	UG/L
	Mg	3240.0	J	UG/L
	Mn	21.0	=	UG/L
	Na	2130.0	J	UG/L
	Ni	3.4	J	UG/L
	Pb	11.8	U	UG/L
	Sb	2.4	U	UG/L
	Se	3.2	U	UG/L
	Sn	4.0	J	UG/L
	Tl	12.0	UJ	UG/L
	V	13.1	J	UG/L
	Zn	174.0	=	UG/L
	Methylene Chloride	37.0	J	UG/L
	Acenaphthene	2.0	J	UG/L

U = Parameter not detected; value shown is the detection limit

J = Estimated concentration

UJ = Parameter not detected; value shown is the estimated detection limit

R = Analysis rejected in data validation process

Data Validation Report

EnSafe
Charleston - Zone F
SDG #: 31821



HEARTLAND

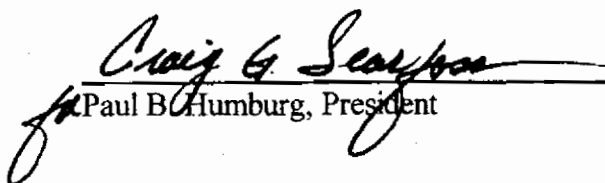
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#: 31821
Date: December 23, 1997
Client Name: EnSafe
Project/Site Name: Charleston - Zone F
Date Sampled: November 12-17, 1997
Number of Samples: 21 Aqueous Sample(s) with 0 MS/MSD(s)
Laboratory: Southwest Laboratory of Oklahoma
Validation Guidance: National Functional Guidelines for Organic and Inorganic Data, February, 1994
QA/QC Level: EPA DQO Level III
Method(s) Utilized: SW846 Third Edition
Analytical Fractions: Volatiles, Semivolatiles, Metals

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user is urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:


Paul B. Humburg, President

12/30/97
Date

SDG# 31821

Samples and Fractions Reviewed

Sample Identifications

Analytical Fractions

ENSAFE ID	MATRIX	VOA	SVOA	TAL			
240GW00304	WATER	X	X	X			
240DW00304	WATER	X	X	X			
240EW00304	WATER	X	X	X			
240FW00304	WATER	X	X	X			
GELGW00504	WATER	X	X	X			
GELGW00704	WATER	X	X	X			
GELGW01104	WATER	X	X	X			
240TW00304	WATER	X					
GELGW01204	WATER	X	X	X			
GELHW01204	WATER	X	X	X			
GELTW01204	WATER	X					
GELGW00804	WATER	X	X	X			
GELGW00604	WATER	X	X	X			
GELGW01304	WATER	X	X	X			
GELTW01304	WATER	X					
620GW00204	WATER	X	X	X			
620DW00204	WATER	X	X	X			
620EW00204	WATER	X	X	X			
620FW00204	WATER	X	X	X			
620GW003A3	WATER	X	X	X			
620TW00204	WATER	X					
Total Billable Samples (Water/Soil)		21	0	17	0	17	0

VOA= SW846 Volatiles

SVOA= SW846 Semivolatiles

TAL= SW846 Metals

DATA ASSESSMENT NARRATIVES

DATA ASSESSMENT NARRATIVE

VOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8260; the National Functional Guidelines for Organic Data Validation, 1994, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 31821

A validation was performed on the Volatile Data from SDG 31821. The data was evaluated based on the following parameters:

- * • Data Completeness
- * • Holding Times
- * • GC/MS Tuning
- * • Calibration
- * • Blanks
- * • Surrogate Recoveries
- * • Matrix Spike/Matrix Spike Duplicates
- * • Field Duplicates
- * • Internal Standard Performance
- * • Compound Identification
- * • Compound Quantitation

* - All criteria were met for this parameter.

System Performance and Overall Assessment

The data is reported as is without qualifications and rejections.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

UR = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that compound is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID

COMPOUND ID

DL QL

No qualifications are required.

- * DL denotes the Form I qualifier supplied by the laboratory
- QL denotes the qualifier used by the data validation firm
- + in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8270; the National Functional Guidelines for Organic Data Validation, 1994, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 31821

A validation was performed on the Semivolatile Data from SDG 31821. The data was evaluated based on the following parameters:

- * • Data Completeness
- * • Holding Times
- * • GC/MS Tuning
- * • Calibration
- Blanks
- Surrogate Recoveries
- * • Matrix Spike/Matrix Spike Duplicates
- * • Field Duplicates
- * • Internal Standard Performance
- * • Compound Identification
- * • Compound Quantitation

* - All criteria were met for this parameter.

Blanks

One of the four method blanks exhibited contamination for bis(2-ethylhexyl)phthalate.

<u>Blank ID</u>	<u>Compound Detected</u>	<u>Concentration</u>	<u>Action Limit</u>
SBLK1	bis(2-EH)phthalate	6 µg/L	60 µg/L

Data Assessment Narrative

Semivolatiles

Page - 2

Blanks - continued

<u>Sample ID</u>	<u>Compound Detected</u>	<u>Concentration</u>	<u>Qualification</u>
240-G-W003-04	bis(2-EH)phthalate	7 µg/L	CRQL
GEL-G-W005-04		7 µg/L	CRQL
GEL-G-W007-04		6 µg/L	CRQL
GEL-G-W011-04		7 µg/L	CRQL

<u>Blank ID</u>	<u>Compound Detected</u>	<u>Concentration</u>	<u>Action Limit</u>
620-F-W002-04	bis(2-EH)phthalate	1 µg/L	10 µg/L

<u>Sample ID</u>	<u>Compound Detected</u>	<u>Concentration</u>	<u>Qualification</u>
620-G-W002-04	bis(2-EH)phthalate	2 µg/L	CRQL
620-G-W003-A3	bis(2-EH)phthalate	3 µg/L	CRQL

<u>Blank ID</u>	<u>Compound Detected</u>	<u>Concentration</u>	<u>Action Limit</u>
240-F-W003-04	bis(2-EH)phthalate	8 µg/L	80 µg/L

<u>Sample ID</u>	<u>Compound Detected</u>	<u>Concentration</u>	<u>Qualification</u>
GEL-G-W006-04	bis(2-EH)phthalate	5 µg/L	CRQL
GEL-G-W008-04	bis(2-EH)phthalate	2 µg/L	CRQL
GEL-H-W012-04	bis(2-EH)phthalate	2 µg/L	CRQL
GEL-G-W013-04	bis(2-EH)phthalate	12 µg/L	U

Surrogates

Sample GEL-G-W011-04 exhibited the acid surrogates phenol-d5, 2-fluorophenol, and 2,4,6-tribromophenol with 1%, 2%, and 7% recoveries, respectively. For the acid compounds only, reject (UR) all non detect results (no positive results for acid compounds).

System Performance and Overall Assessment

The data is reported as is with qualifications and rejections. Sample GEL-G-W011-04 is reported in favor of the re-extraction due to holding time deficiencies and similar surrogate recoveries.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

UR = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that compound is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

<u>SAMPLE ID</u>	<u>COMPOUND ID</u>	<u>DL</u>	<u>QL</u>
240-G-W003-04	bis(2-EH)phthalate	+J	CRQL
GEL-G-W005-04			CRQL
GEL-G-W007-04			CRQL
GEL-G-W011-04			CRQL
620-G-W002-04	bis(2-EH)phthalate	+J	CRQL
620-G-W003-A3			CRQL
GEL-G-W006-04	bis(2-EH)phthalate	+J	CRQL
GEL-G-W008-04			CRQL
GEL-H-W012-04			CRQL
GEL-G-W013-04		+	U
GEL-G-W011-04	all acid compounds	-	UR

- * DL denotes the Form I qualifier supplied by the laboratory
 QL denotes the qualifier used by the data validation firm
 + in the DL column denotes a positive result
 - in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE METALS

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW 846 Appendix IX Methods; the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 31821

A validation was performed on the Metals Data from SDG 31821. The data was evaluated based on the following parameters.

- * • Data Completeness
- * • Holding Times
- * • Calibrations
- Blanks
- * • Interferences
- * • Matrix Spike Recovery
- * • Matrix Duplicates
- * • Field Duplicates
- * • Laboratory Control Samples
- Serial Dilutions

* - All criteria were met for this parameter.

Preparation and Field Blanks

The preparation blank exhibited contamination for the following elements.

<u>Elements</u>	<u>Conc.</u>	<u>Samples affected</u>
Antimony	3.46 ug/l	all water samples below 17.3 ug/l
Lead	1.10 ug/l	all water samples below 5.5 ug/l
Manganese	2.17 ug/l	no impact
Sodium	33.5 ug/l	no impact

The field blanks exhibited contamination for the following elements.

<u>Elements</u>	<u>Conc.</u>	<u>Samples affected</u>
Aluminum	39.8 ug/l	all water samples below 199 ug/l
Beryllium	0.34 ug/l	all water samples below 1.7 ug/l
Calcium	120 ug/l	no impact
Iron	39.9 ug/l	no impact
Manganese	10.4 ug/l	all water samples below 52.0 ug/l
Nickel	1.1 ug/l	all water samples below 5.5 ug/l
Zinc	14.9 ug/l	all water samples below 74.5 ug/l
Sodium	18200 ug/l	all water samples below 91000ug/l

The USEPA requires that all sample values below five times the preparation, field, DI or calibration blank contamination be qualified as non-detect, "U".

Serial Dilution results

The serial dilution RPD for waters for Aluminum was greater than 10%. All positive results are qualified as estimated, "J".

"B" Qualifier

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B" per Ensafe's request.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
All water samples below 199 ug/l	Al.	+	U
All water samples below 17.3 ug/l	Sb.		
All water samples below 1.7 ug/l	Be.		
All water samples below 9.4 ug/l	Pb.		
All water samples below 52.0 ug/l	Mn.		
All water samples below 5.5 ug/l	Ni.		
All water samples below 91000 ug/l	Na.		
All water samples below 74.5 ug/l	Zn.		
All water samples	Al.	+	J
All "B" results	all analytes	B	J



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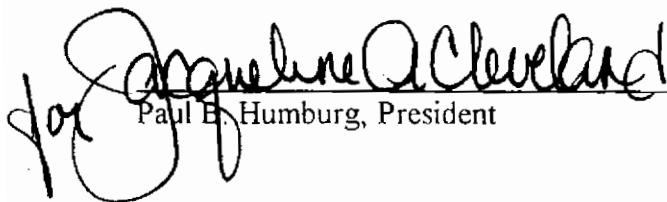
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#: 31911
Date: December 31, 1997
Client Name: EnSafe
Project/Site Name: Charleston - Zone F
Date Sampled: November 20-25, 1997
Number of Samples: 20 Aqueous Sample(s) with 0 MS/MSD(s)
Laboratory: Southwest Laboratory of Oklahoma
Validation Guidance: National Functional Guidelines for Organic and Inorganic Data, February, 1994
QA/QC Level: EPA DQO Level III
Method(s) Utilized: SW846 Third Edition
Analytical Fractions: Volatiles, Semivolatiles, Pesticide/PCB's, Metals, Cyanide, Chlorides, Sulfates, Total Dissolved Solids

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user is urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:


Paul E. Humburg, President

123197
Date

SDG# 31911

Samples and Fractions Reviewed

Sample Identifications

Analytical Fractions

ENSAFE ID	MATRIX	VOA	SVOA	P/P	TAL	CN	CHL	SUL	TDS						
620GW00104	WATER	X	X		X										
620GW004A3	WATER	X	X		X										
SMEGW00804	WATER	X	X		X										
SMETW00804	WATER	X													
SMEGW00504	WATER	X	X		X										
SMEGW00604	WATER	X	X		X										
SMEGW00704	WATER	X	X		X										
SMEHW00704	WATER	X	X		X										
SMETW00704	WATER	X													
SMEGW00104	WATER	X	X		X										
SMEGW00304	WATER	X	X		X										
SMEGW00404	WATER	X	X		X										
617GW002A3	WATER	X	X		X										
617TW002A3	WATER	X													
GDFGW00104	WATER	X	X	X	X	X	X	X	X						
GDFDW00104	WATER	X	X	X	X	X	X	X	X						
GDFEW00104	WATER	X	X	X	X	X	X	X	X						
GDFFW00104	WATER	X	X	X	X	X	X	X	X						
GDFGW01D04	WATER	X	X	X	X	X	X	X	X						
GDFTW01D04	WATER	X													
Total Billable Samples (Water/Soil)		20	0	16	0	5	0	16	0	5	0	5	0	5	0

VOA= SW846 Volatiles

SVOA= SW846 Semivolatiles

P/P= SW846 Pesticide/PCB's

TAL= SW846 Metals

CN= SW846 Cyanide

CHL= SW846 Chlorides

SUL= SW846 Sulfates

TDS= SW846 Total Dissolved Solids

DATA ASSESSMENT NARRATIVES

DATA ASSESSMENT AND NARRATIVE

VOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA SW846 Method 8260 with CLP deliverables; National Functional Guidelines for Organic Data Review, and DQO Level III. All comments made within this report should be considered when examining the analytical results (Form I's).

SDG # 31911

A validation was performed on the Volatile Data from SDG 31911. The data was evaluated based on the following parameters.

- * • Data Completeness
- * • Holding Times
- * • GC/MS Tuning
- Calibrations
- * • Internal Standard Performance
- Blanks
- Surrogate Recoveries
- * • Matrix Spike/Matrix Spike Duplicate
- * • Field Duplicates
- Compound Identification /Quantitation

* - All criteria were met for this parameter

Continuing calibrations

The continuing calibrations that were analyzed with this data package exhibited %Ds that were not within %D continuing calibration criteria. All RRFs were within calibration criteria.

DATA ASSESSMENT AND NARRATIVE VOLATILE ANALYSIS

PAGE - 2

Continuing calibrations (continued)

The continuing calibration, I25574, contained compounds with %Ds greater than 50% D but less than 90% D. For the samples and non compliant compounds listed below, qualify all positive results as estimated (J) and all non detects as estimated (UJ).

620GW00104	bromomethane (-59.5)
620GW004A3	chloroethane (-80.4)
SMEGW00804	
SMEGW00504	

Method Blanks

The method blanks associated with these samples exhibited contamination and the samples required qualifications. The end-user should note that the action levels indicated for the blank analysis may not involve the same weights, volumes, dilution factors, or percent moisture as the associated samples. These factors must be taken into consideration when applying the 5X or 10X criteria to field samples.

<u>Associated Blank</u>	<u>Compound</u>	<u>Concentration</u>	<u>Action Level</u>
SBLK1	methylene chloride	5	50

<u>Sample ID</u>	<u>Compound</u>	<u>Qualification</u>
620GW00104	methylene chloride	U
620GW004A3		
SMEGW00804		

Surrogates

Surrogate recoveries for all samples and blanks did not meet QA/QC criteria. Sample SMEGW00504, exhibited a low surrogate recovery for toluene-d₈ (81%). Qualify all positive results as estimated (J) and all non detects as estimated (UJ).

Compound Identification/Quantitation (continued)

For the sample SMEGW00504, replace all E-flagged results with the D-flagged results found in the dilution. For the diluted sample SMEGW00504DL, only use the D-flagged results.

**DATA ASSESSMENT AND NARRATIVE
VOLATILE ANALYSIS**

PAGE - 3

System Performance and Overall Assessment

The laboratory did not encounter any large problems. The data as presented requires qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

NJ = Presumptive evidence for the presence of the material at an estimated value

K = Result is biased high

L = Result is biased low

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

<u>SAMPLE ID</u>	<u>ANALYTE ID</u>	<u>DL</u>	<u>QL</u>
620GW00104 620GW004A3 SMEGW00804 SMEGW00504	bromomethane (-59.5) chloroethane (-80.4)	+/-	J/UJ
620GW00104 620GW004A3 SMEGW00804	methylene chloride	+	U
SMEGW00504	All results	+/-	J/UJ
SMEGW00504	E-flagged results	+	D
SMEGW00504DL	All results except D-flagged results.	+/-	Do not use

- * DL denotes the Form I qualifier supplied by the laboratory
 QL denotes the qualifier used by the data validation firm
 + in the DL column denotes a positive result
 - in the DL column denotes a non detect result

DATA ASSESSMENT AND NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA SW846 Method 8270 with CLP deliverables; National Functional Guidelines for Organic Data Review, and DQO Level III. All comments made within this report should be considered when examining the analytical results (Form I's).

SDG # 31911

A validation was performed on the Semivolatile Data from SDG 31911. The data was evaluated based on the following parameters.

- * • Data Completeness
- * • Holding Times
- * • GC/MS Tuning
- Calibrations
- * • Internal Standard Performance
- Blanks
- Surrogate Recoveries
- * • Matrix Spike/Matrix Spike Duplicate
- * • Field Duplicates
- Compound Identification /Quantitation

* - All criteria were met for this parameter

Continuing calibrations

The continuing calibrations that were analyzed with this data package exhibited %Ds that were not within %D continuing calibration criteria. All RRFs were within calibration criteria.

**DATA ASSESSMENT AND NARRATIVE
SEMIVOLATILE ANALYSIS**

PAGE - 2

Continuing calibrations (continued)

The continuing calibration, M8357, contained compounds with %Ds greater than 50% D but less than 90% D. For the samples and non compliant compounds listed below, qualify all positive results as estimated (J) and all non detects as estimated (UJ).

SMEGW00704	2,4-dinitrotoluene (84.8)
SMEHW00704	
SMEGW00504	
620GW00104	

Method Blanks

The method blanks associated with these samples exhibited contamination and the samples required qualifications. The end-user should note that the action levels indicated for the blank analysis may not involve the same weights, volumes, dilution factors, or percent moisture as the associated samples. These factors must be taken into consideration when applying the 5X or 10X criteria to field samples.

<u>Associated Blank</u>	<u>Compound</u>	<u>Concentration</u>	<u>Action Level</u>
SBLK2	bis(2-ethylhexyl)phthalate	1J	10
SBLK4	bis(2-ethylhexyl)phthalate	1J	10

<u>Sample ID</u>	<u>Compound</u>	<u>Qualification</u>
SMEGW00704	bis(2-ethylhexyl)phthalate	CRQL
SMEHW00704		
GDFGW00104		

QC Blanks

The QC blanks associated with these samples exhibited contamination and the samples required qualifications. The end-user should note that the action levels indicated for the blank analysis may not involve the same weights, volumes, dilution factors, or percent moisture as the associated samples. These factors must be taken into consideration when applying the 5X or 10X criteria to field samples.

**DATA ASSESSMENT AND NARRATIVE
SEMIVOLATILE ANALYSIS**

PAGE - 3

QC Blanks (continued)

<u>Associated Blank</u>	<u>Compound</u>	<u>Concentration</u>	<u>Action Level</u>
GDFDW00104	bis(2-ethylhexyl)phthalate	2J	20

<u>Sample ID</u>	<u>Compound</u>	<u>Qualification</u>
SMEGW00404	bis(2-ethylhexyl)phthalate	CRQL

Surrogates

The samples listed below, exhibited surrogate recoveries that were less than 10%. Qualify all positive results for the base/neutral fraction as estimated (J) and reject all non detects (UR).

GDFGW00104	nitrobenzene (9%)
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The samples listed below, exhibited surrogate recoveries that were less than 10%. Qualify all positive results for the acid fraction as estimated (J) and reject all non detects (UR).

GDFGW01D04	phenol (2%)
	2-fluorophenol (1%)
	2,4,6-tribromophenol (2%)

Compound Identification/Quantitation

Do not use the results for the re-analyzed samples GDFGW00104RE and GDFGW01D04RE, in favor of the original sample analysis due to similar non compliant surrogate recoveries and exceeding the extraction holding time.

For the sample SMEGW00504, replace all E-flagged results with the D-flagged results found in the dilution. For the diluted sample SMEGW00504DL, only use the D-flagged results.

System Performance and Overall Assessment

The laboratory did not encounter any large problems. The data as presented requires qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

NJ = Presumptive evidence for the presence of the material at an estimated value

K = Result is biased high

L = Result is biased low

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

<u>SAMPLE ID</u>	<u>ANALYTE ID</u>	<u>DL</u>	<u>QL</u>
SMEGW00704 SMEHW00704 SMEGW00504 620GW00104	2,4-dinitrotoluene (84.8)	+/-	J/UJ
SMEGW00704 SMEHW00704 GDFGW00104	bis(2-ethylhexyl)phthalate	+	CRQL
SMEGW00404	bis(2-ethylhexyl)phthalate	+	CRQL
GDFGW01D04	All results acid fraction	+/-	J/UR
GDFGW00104	All results base/neutral fraction	+/-	J/UR
GDFGW01D04RE GDFGW00104RE	All results	+/-	do not use
SMEGW00504	E-Flagged results	+	D
SMEGW00504DL	All results except D-Flagged results	+/-	Do not use

- * DL denotes the Form I qualifier supplied by the laboratory
 QL denotes the qualifier used by the data validation firm
 + in the DL column denotes a positive result
 - in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

PESTICIDE/PCBs

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA SW846, Method 8081; the National Functional Guidelines for Organic Data Review, February 1994, and DQO Level III. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG # 31911

A validation was performed on the Pesticide/PCB Data from SDG 31911. The data was evaluated based on the following parameters.

- * • Data Completeness
- * • Holding Times
- * • Calibrations
- * • GC Performance
- * • Blanks
- * • Surrogate Recoveries
- * • Matrix Spike/Matrix Spike Duplicate
- * • Field Duplicates
- * • Compound Identification /Quantitation

* - All criteria were met for this parameter

System Performance and Overall Assessment

The data is reported as is without qualifications or rejections.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D= result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

<u>SAMPLE ID</u>	<u>ANALYTE ID</u>	<u>DL</u>	<u>QL</u>
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No qualifications are required.

- * DL denotes the Form I qualifier supplied by the laboratory
- QL denotes the qualifier used by the data validation firm
- + in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE METALS, CYANIDE AND WET CHEMISTRY

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW 846 Appendix IX Methods; the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 31911

A validation was performed on the Metals, Cyanide and Wet Chemistry Data from SDG 31911. The data was evaluated based on the following parameters.

- * ● Data Completeness
- * ● Holding Times
- * ● Calibrations
- Blanks
- * ● Interferences
- * ● Matrix Spike Recovery
- * ● Matrix Duplicates
- Field Duplicates
- * ● Laboratory Control Samples
- Serial Dilutions

* - All criteria were met for this parameter.

Preparation and Field Blanks

The field blanks exhibited contamination for the following elements.

<u>Elements</u>	<u>Conc.</u>	<u>Samples affected</u>
Aluminum	29.4 ug/l	all water samples below 147 ug/l
Barium	0.49 ug/l	no impact
Chromium	1.5 ug/l	all water samples below 7.5 ug/l
Copper	1.6 ug/l	all water samples below 8.0 ug/l
Iron	28.2 ug/l	no impact
Lead	1.5 ug/l	all water samples below 7.5 ug/l
Manganese	0.49 ug/l	no impact
Sodium	19200 ug/l	all water samples below 96000 ug/l

Zinc	14.6 ug/l	all water samples below 73.0 ug/l
Chloride	35.1 mg/l	all water samples below 176 mg/l
TDS	66.0 mg/l	no impact

The USEPA requires that all sample values below five times the preparation, field, DI or calibration blank contamination be qualified as non-detect, "U".

The preparation blank exhibited negative bias for the following elements.

<u>Elements</u>	<u>Conc.</u>	<u>Samples affected</u>
Antimony	-1.73 ug/l	all water samples below 17.3 ug/l

This reviewer qualifies all positive and non-detect results below ten times the negative bias as estimated, "J" or "UJ".

Field Duplicate Results

The RPDs for samples SMEGW00704 and SMEHW00704 for Aluminum (47%), Calcium (38%), Sodium (45%) and Manganese (45%) were greater than 35%. All positive and non-detect results are qualified as estimated, "J" or "UJ".

Serial Dilution results

The serial dilution RPDs for waters for Barium and Iron were greater than 10%. All positive results are qualified as estimated, "J".

"B" Qualifier

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B" per Ensafes's request.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
all water samples below 147 ug/l	Al.	+	U
all water samples below 7.5 ug/l	Cr.		
all water samples below 8.0 ug/l	Cu.		
all water samples below 7.5 ug/l	Pb.		
all water samples below 96000 ug/l	Na.		
all water samples below 73.0 ug/l	Zn.		
all water samples below 176 mg/l	Cl.		
all water samples below 17.3 ug/l	Sb.	+/U	J/UJ
SMEGW00704 and SMEHW00704	Al, Ca, Na and Mn.	+/U	J/UJ
All water samples	Ba and Fe.	+	J
All "B" results	all analytes	B	J

Data Validation Report

EnSafe
Charleston - Zone F
SDG #: 32688



HEARTLAND

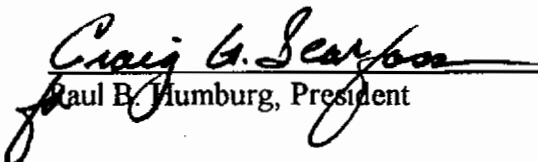
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#: 32688
Date: March 18, 1998
Client Name: EnSafe
Project/Site Name: Charleston - Zone F
Date Sampled: February 9-11, 1998
Number of Samples: 14 Aqueous Sample(s) with 0 MS/MSD(s)
Laboratory: Southwest Laboratory of Oklahoma
Validation Guidance: National Functional Guidelines for Organic and Inorganic Data, February, 1994
QA/QC Level: EPA DQO Level III
Method(s) Utilized: SW846 Third Edition
Analytical Fractions: Volatiles, Semivolatiles, Pesticide/PCB's, Explosives, Hydrazine, Metals

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user is urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:


Paul B. Mumburg, President

3/31/98.
Date

SDG# 32688

Samples and Fractions Reviewed

Sample Identifications

Analytical Fractions

ENSAFE ID	MATRIX	VOA		SVOA		P/P		EXP		HYD		TAL	
607GW008A4	WATER	X		X								X	
607GW009A4	WATER	X		X								X	
607GW06DA4	WATER	X		X								X	
607GW06IA4	WATER	X		X								X	
607TW06IA4	WATER	X											
607EW06IA4	WATER	X		X		X		X		X		X	
607FW06IA4	WATER	X		X		X		X		X		X	
607DW06IA4	WATER	X		X		X		X		X		X	
617GW002A4	WATER	X		X								X	
617TW002A4	WATER	X											
620GW003A4	WATER	X		X								X	
620GW004A4	WATER	X		X								X	
620HW004A4	WATER	X		X								X	
620TW004A4	WATER	X											
Total Billable Samples (Water/Soil)		14	0	11	0	3	0	3	0	3	0	11	0

VOA= SW846 Volatiles
 SVOA= SW846 Semivolatiles
 P/P= SW846 Pesticide/PCB's
 EXP= SW846 Explosives
 HYD= SW846 Hydrazine
 TAL= SW846 Metals

DATA ASSESSMENT NARRATIVES

DATA ASSESSMENT NARRATIVE

VOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8260A, Revision 2, 9/94; the National Functional Guidelines for Organic Data Validation, February 1994, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 32688

A validation was performed on the Volatile Data from SDG 32688. The data was evaluated based on the following parameters:

- * • Data Completeness
- * • Holding Times
- * • GC/MS Tuning
- Calibration
- * • Blanks
- * • Surrogate Recoveries
- * • Matrix Spike/Matrix Spike Duplicates
- * • Field Duplicates
- * • Internal Standard Performance
- * • Compound Identification
- Compound Quantitation

* - All criteria were met for this parameter.

Calibrations

The continuing calibration standard ul4094.d exhibited one (1) compound with a %D greater than 50% but less than 90%. For the following samples and compound, all reported positive and non-detect results are qualified as estimated, J/UJ.

607GW06IA4DL

tetrachloroethene (68.8%)

**DATA ASSESSMENT NARRATIVE
VOLATILE ANALYSIS**

PAGE - 2

Compound Quantitation

For the following sample, the E flagged results in the undiluted sample are replaced with the corresponding D flagged result in the dilution analysis. All other results from the dilution analysis are not used in favor of the results reported from the undiluted analysis.

607GW06IA4

System Performance and Overall Assessment

The data required qualifications/rejections.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

UR = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that compound is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

<u>SAMPLE ID</u>	<u>COMPOUND ID</u>	<u>DL</u>	<u>QL</u>
607GW06IA4DL	tetrachloroethene (68.8%)	+/-	J/UJ
607GW06IA4	All E flagged Results	+E	Do Not Use
607GW06IA4 DL	All except corresponding D flagged results.	+/-	Do Not Use

- * DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8270B, Revision 2, 9/94; the National Functional Guidelines for Organic Data Validation, February 1994, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 32688

A validation was performed on the Semivolatile Data from SDG 32688. The data was evaluated based on the following parameters:

- * • Data Completeness
- * • Holding Times
- * • GC/MS Tuning
- Calibration
- Blanks
- Surrogate Recoveries
- * • Matrix Spike/Matrix Spike Duplicates
- * • Field Duplicates
- * • Internal Standard Performance
- * • Compound Identification
- Compound Quantitation

* - All criteria were met for this parameter.

Calibrations

The continuing calibration standard T25642.D exhibited one (1) compound with a %D greater than 50% but less than 90%. For the following samples and compound, all reported positive and non-detect results are qualified as estimated, J/UJ.

607GW009A4	n-nitroso-di-n-propylamine (52.7%)
620GW003A4	
620GW004A4	
620HW004A4	

**DATA ASSESSMENT NARRATIVE
SEMIVOLATILE ANALYSIS**

PAGE - 2

Method Blanks

The method blanks associated with samples in this SDG exhibited contamination. Several samples required qualification. The end-user should note that the action levels indicated for the blank analysis may not involve the same weights, volumes, dilution factors, or percent moisture as associated samples. These factors must be taken into consideration when applying the 5X or 10X criteria to field samples.

<u>Associated Blank</u>	<u>Compound</u>	<u>Conc.</u>	<u>Action Level</u>
SBLK2	bis(2-ethylhexyl)phthalate	4J µg/L	40 µg/L

<u>Samples</u>	<u>Compound</u>	<u>Qualification</u>
607GW06DA4	bis(2-ethylhexyl)phthalate	CRQL
607GW008A4		

Field QC Blanks

The field QC blanks associated with samples in this SDG exhibited contamination and several samples required qualification. The end-user should note that the action levels indicated for the blank analysis may not involve the same weights, volumes, dilution factors, or percent moisture as associated samples. These factors must be taken into consideration when applying the 5X or 10X criteria to field samples.

<u>Associated Blanks</u>	<u>Compound</u>	<u>Conc.</u>	<u>Action Level</u>
607FW06A14	bis(2-ethylhexyl)phthalate	7J µg/L	70 µg/L

<u>Samples</u>	<u>Compound</u>	<u>Qualification</u>
607GW061A4	bis(2-ethylhexyl)phthalate	CRQL
617GW003A4		
620GW004A4		
607GW009A4	bis(2-ethylhexyl)phthalate	U
620HW004A4DL		

**DATA ASSESSMENT NARRATIVE
SEMIVOLATILE ANALYSIS**

PAGE - 3

Surrogate Recoveries

Sample 607GW06IA4 exhibited acid surrogate recoveries below 10% in both the original analysis and RE analysis. For the following samples and compounds, all positive results for the acid fraction are qualified as estimated, J, and all non-detect results are rejected, UR.

<u>SAMPLE</u>	<u>COMPOUNDS</u>	<u>SURROGATE %R</u>
607GW06IA4	acid fraction results	Phenol 2 %, 2-fluorophenol 2 %, 2,4,6-tribromophenol 2 %
607GW06IA4RE	acid fraction results	Phenol 8 %, 2-fluorophenol 12 %

Compound Quantitation

For the following sample, the acid fraction results are not used in favor of the acid fraction results reported from the RE analysis of the sample. Although the RE was extracted outside holding times, the surrogate recoveries were somewhat improved.

607GW06IA4

For the following sample, the E flagged results in the undiluted sample are replaced with the corresponding D flagged result in the dilution analysis. All other results from the dilution analysis are not used in favor of the results reported from the undiluted analysis.

620HW004A4

System Performance and Overall Assessment

The data required qualifications/rejections.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

UR = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that compound is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

<u>SAMPLE ID</u>	<u>COMPOUND ID</u>	<u>DL</u>	<u>QL</u>
607GW009A4 620GW003A4 620GW004A4 620HW004A4	n-nitroso-di-n-propylamine	+/-	J/UJ
607GW06DA4 607GW008A4	bis(2-ethylhexyl)phthalate	+B	CRQL
607GW061A4 617GW003A4 620GW004A4	bis(2-ethylhexyl)phthalate	+B	CRQL
607GW009A4 607HW004A4DL	bis(2-ethylhexyl)phthalate	+B	U
607GW06IA4 607GW06IA4RE	Acid Fraction Results	+/-	J/UR
607GW06IA4	Acid Fraction Results	+/-	Not Used
620HW004A4	All E flagged Results	+E	Do Not Use
620HW004A4DL	All except corresponding D flagged results	+/-	Not Used

- * DL denotes the Form I qualifier supplied by the laboratory
 QL denotes the qualifier used by the data validation firm
 + in the DL column denotes a positive result
 - in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

PESTICIDE/PCBs

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA SW846, Method 8081/8082; the National Functional Guidelines for Organic Data Review, February 1994, where applicable and DQO Level III. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG # 32688

A validation was performed on the Pesticide/PCB Data from SDG 32688. The data was evaluated based on the following parameters.

- * • Data Completeness
- * • Holding Times
- * • Calibrations
- * • GC Performance
- * • Blanks
- * • Surrogate Recoveries
- * • Matrix Spike/Matrix Spike Duplicate
- * • Field Duplicates
- * • Compound Identification /Quantitation

* - All criteria were met for this parameter

System Performance and Overall Assessment

The data is reported as is without qualifications or rejections.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

<u>SAMPLE ID</u>	<u>ANALYTE ID</u>	<u>DL</u>	<u>QL</u>
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No qualifications are required.

- * DL denotes the Form I qualifier supplied by the laboratory
- QL denotes the qualifier used by the data validation firm
- + in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

EXPLOSIVES

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, calibration data, blank analysis results, and LCS recoveries. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8330; the National Functional Guidelines for Organic Data Review, where applicable; and EPA DQO Level III requirements. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG# 32688

A validation was performed on the Explosives data from SDG 32688. The data was evaluated based on the following parameters.

- * • Data Completeness
- * • Holding Times
- * • HPLC Performance
- * • Calibrations
- * • Blanks
- * • LCS Recoveries
- * • Field Duplicates
- * • Identification/Quantitation

* - All criteria were met for this parameter.

Overall Performance

No qualifications were required.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

- U** = Not detected
- J** = Estimated value
- UJ** = Reported Quantitation limit is qualified as estimated
- UR** = Result is rejected and unusable
- D** = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

- CRQL** = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that compound is reported.
- U** = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.
- No Action** = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID

COMPOUND ID

DL

QL

NO QUALIFICATIONS WERE REQUIRED

- * DL denotes the Form I qualifier supplied by the laboratory
- QL denotes the qualifier used by the data validation firm
- + in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE METALS and HYDRAZINE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW 846 Methods; the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 32688

A validation was performed on the Metals and Hydrazine Data from SDG 32688. The data was evaluated based on the following parameters.

- * ● Data Completeness
- * ● Holding Times
- * ● Calibrations
- Blanks
- * ● Interferences
- * ● Matrix Spike Recovery
- * ● Matrix Duplicates
- * ● Field Duplicates
- * ● Laboratory Control Samples
- Serial Dilutions

* - All criteria were met for this parameter.

Preparation and Field Blanks

The preparation, field and calibration blanks exhibited contamination for the following elements.

<u>Elements</u>	<u>Conc.</u>	<u>Samples affected</u>
Aluminum	19.6 ug/l	all water samples below 98.0 ug/l
Antimony	2.52 ug/l	all water samples below 12.6 ug/l
Arsenic	2.2 ug/l	all water samples below 11.0 ug/l
Barium	0.98 ug/l	all water samples below 4.9 ug/l
Beryllium	0.3 ug/l	no impact
Calcium	99.8 ug/l	no impact
Iron	35.9 ug/l	all water samples below 180.0 ug/l

Magnesium	49.8 ug/l	no impact
Manganese	0.72 ug/l	all water samples below 3.6 ug/l
Silver	1.1 ug/l	no impact
Potassium	699 ug/l	all water samples below 3495 ug/l
Sodium	24700 ug/l	all water samples below 123500 ug/l
Zinc	7.6 ug/l	all water samples below 38.0 ug/l

The USEPA requires that all sample values below five times the preparation or calibration blank contamination be qualified as non-detect, "U".

Serial Dilution results

The serial dilution RPDs for waters for Barium and Sodium were greater than 10%. All positive results are qualified as estimated, "J".

"B" Qualifier

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B" per Ensaf's request.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
all water samples below 98.0 ug/l	Al.	+	U
all water samples below 12.6 ug/l	Sb.		
all water samples below 11.0 ug/l	As.		
all water samples below 4.9 ug/l	Ba.		
all water samples below 180.0 ug/l	Fe.		
all water samples below 3.6 ug/l	Mn.		
all water samples below 3495 ug/l	K.		
all water samples below 123500 ug/l	Na.		
all water samples below 38.0 ug/l	Zn.		
all water samples	Ba and Na.	+	J
All "B" results	all analytes	B	J



HEARTLAND

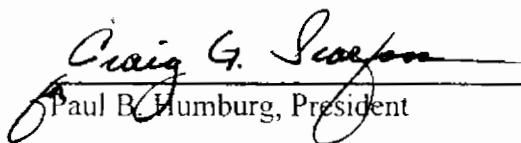
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#: EN022
Date: November 29, 1999
Client Name: Ensafe
Project/Site Name: Charleston Zone F
Date Sampled: October 15, 1999
Number of Samples: 27 Non-Aqueous Sample(s) with 0 MS/MSD(s)
1 Aqueous Sample(s) with 0 MS/MSD(s)
Laboratory: Laucks Testing Laboratories
Validation Guidance: National Functional Guidelines for Organic and Inorganic Data,
February, 1994
QA/QC Level: DQO Level III
Method(s) Utilized: SW846 Third Edition
Analytical Fractions: Volatiles, SPLP Volatiles, Semivolatiles, SPLP Semivolatiles,
Pesticides/PCBs, SPLP Pesticides/PCBs, Metals, SPLP Metals,
Cyanide, SPLP Cyanide and Total Organic Carbon

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user is urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:


Paul B. Humburg, President

12-2-99
Date

Samples and Fractions Reviewed

Sample Identifications

Analytical Fractions

ENSAFE ID	MATRIX	VOA	SPLP-V	SVOA	SPLP-SV	P/P	SPLP-P/P	MET	SPLP-MET	CN	SPLP-CN	TOC
607SB008T1	SOIL	X		X		X		X		X		X
607SB008T2	SOIL	X		X		X		X		X		X
607SB016T2	SOIL	X		X		X		X		X		X
609SB001T1	SOIL	X		X		X		X		X		X
609SB001T2	SOIL	X		X		X		X		X		X
609SB002T1	SOIL	X		X		X		X		X		X
609SB002T2	SOIL	X		X		X		X		X		X
609SB00801	SOIL							X				
609SB00802	SOIL							X				
620SB008T1	SOIL	X		X		X		X		X		X
620SB01001	SOIL					X						
620SB01101	SOIL					X						
620SB01102	SOIL					X						
620SB01201	SOIL			X								
620SB01202	SOIL			X								
620SB01301	SOIL			X								
620SB01302	SOIL			X								
620SB01401	SOIL			X								
620SB01402	SOIL			X								
620TB008T1	WATER	X										
607SB008S1	SOIL		X		X		X		X		X	
607SB008S2	SOIL		X		X		X		X		X	
607SB016S2	SOIL		X		X		X		X		X	
609SB001S1	SOIL		X		X		X		X		X	
609SB001S2	SOIL		X		X		X		X		X	
609SB002S1	SOIL		X		X		X		X		X	
609SB002S2	SOIL		X		X		X		X		X	
620SB008S1	SOIL		X		X		X		X		X	
Total Billable Samples (Water/Soil)												8

VOA= Volatiles

SPLP-V= SPLP Volatiles

SVOA= Semivolatiles

SPLP-SV= SPLP Semivolatiles

P/P= Pesticides/PCBs

SPLP-P/P= SPLP Pesticides/PCBs

MET= Metals

SPLP-MET= SPLP Metals

CN= Cyanide

SPLP-CN= SPLP Cyanide

TOC= Total Organic Carbon

DATA ASSESSMENT NARRATIVE

VOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8260B for GC/MS Volatiles; the National Functional Guidelines for Organic Data Validation, 2/94, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # EN022

A validation was performed on the Volatile Data from SDG EN022. The data was evaluated based on the following parameters:

- * • Data Completeness
- * • Holding Times
- * • GC/MS Tuning
- Calibration
- Blanks
- Internal Standard Performance
- * • Surrogate Recoveries
- * • Matrix Spike/Matrix Spike Duplicates
- * • Field Duplicates
- * • Compound Identification
- Compound Quantitation

* - All criteria were met for this parameter.

Calibrations

The continuing calibration standard O1019004.D on Instrument ORCA exhibited one (1) compound with a D greater than 20% but less than 50% for which qualifications were required. For the following samples and non-compliant compound, the reported positive results are qualified as estimated, J.

609SB002T1	acetone (24.4%)
609SB001T1	

DATA ASSESSMENT NARRATIVE VOLATILE ORGANICS

PAGE 2

Calibrations (continued)

The continuing calibration standard O1021005.D on Instrument ORCA exhibited one (1) compound with a D greater than 20% but less than 50% for which qualifications were required. For the following samples and non-compliant compound, the reported positive results are qualified as estimated, J.

609SB001T2RE 2-butanone (20.5%)

The initial calibration analyzed 10/18/99 on Instrument Flipper exhibited one (1) compound with a RF less than 0.05. For the following samples and non-compliant compound, the reported positive results are qualified as estimated, J, and the non-detect results are rejected, UR.

All SPLP samples acetone (0.045)

The continuing calibration F1021005.D exhibited one (1) compound with a RF less than 0.05. For the following samples and non-compliant compound, the reported positive results are qualified as estimated, J, and the non-detect results are rejected, UR.

620SB008S1 acetone (0.044)
607SB016S2
607SB008S1
607SB008S2
609SB002S1
609SB002S2
609SB001S1
609SB001S2

Blanks

The method blanks associated with the field samples in this SDG exhibited contamination for which qualifications were required. The end user should note that the action levels indicated for the blank analysis may not involve the same weights, volumes, dilution factors, or percent moisture as associated samples. These factors must be taken into considerations when applying the 5X and 10X criteria to field samples.

<u>Associated blank</u>	<u>Compound</u>	<u>Concentration</u>	<u>Action Level</u>
VBLKO1	methylene chloride	10 ug/Kg	100 ug/Kg
	acetone	3 ug/Kg	30 ug/Kg

**DATA ASSESSMENT NARRATIVE
VOLATILE ORGANICS**

PAGE 3

Blanks (continued)

<u>Associated blank</u>	<u>Compound</u>	<u>Concentration</u>	<u>Action Level</u>
VBLKO2	methylene chloride	5 ug/Kg	50 ug/Kg
	acetone	2 ug/Kg	20 ug/Kg
<u>Samples</u>	<u>Compound</u>	<u>Qualifications</u>	
620SB008T1	methylene chloride	U	
607SB008T1			
609SB002T1			
609SB002T2			
609SB001T1			
607SB016T2RE			
607SB008T2RE			
609SB001T2RE			
620SB008T1	acetone	U	
607SB008T1			
609SB002T2			
607SB016T2RE			
607SB008T2RE			

Internal Standards

The following samples exhibited non-compliant EICP area recoveries below the QC limits for the noted internal standards. All reported positive and non-detect results are qualified as estimated, J/UJ.

620SB008T1	1,4-dichlorobenzene-d4
607SB016T2RE	
607SB008T2RE	
609SB001T2RE	

**DATA ASSESSMENT NARRATIVE
VOLATILE ORGANICS**

PAGE 4

Compound Quantitation

For the following samples, the reported results are not used in favor of the results reported from the original or RE analysis of the samples. The chosen analyses of the samples exhibited improved internal standard area recoveries.

607SB008T2

607SB016T2

609SB001T2

620SB008T1RE

System Performance and Overall Assessment

The data, as reported, required qualifications/rejections.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

L = Result is estimated and biased low.

K = Result is estimated and biased high.

R = Result is rejected and unusable

D = Result value is based on dilution analysis

BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that compound is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

<u>SAMPLE ID</u>	<u>COMPOUND ID</u>	<u>DL</u>	<u>QL</u>
609SB002T1 609SB001T1	acetone (24.4%)	+	J
609SB001T2RE	2-butanone (20.5%)	+	J
All SPLP samples	acetone (0.045)	+/-	J/UR
620SB008S1 607SB016S2 607SB008S1 607SB008S2 609SB002S1 609SB002S2 609SB001S1 609SB001S2	acetone (0.044)	+/-	J/UR
620SB008T1 607SB008T1 609SB002T1 609SB002T2 609SB001T1 607SB016T2RE 607SB008T2RE 609SB001T2RE	methylene chloride	+B	U
620SB008T1 607SB008T1 609SB002T2 607SB016T2RE 607SB008T2RE	acetone	+B	U

SUMMARY OF DATA QUALIFICATIONS

<u>SAMPLE ID</u>	<u>COMPOUND ID</u>	<u>DL</u>	<u>QL</u>
620SB008T1 607SB016T2RE 607SB008T2RE 609SB001T2RE	<i>All associated with</i> 1,4-dichlorobenzene-d4	+/-	J/UJ
607SB008T2 607SB016T2 609SB001T2 620SB008T1RE	All Compounds	+/-	Do Not Use

- * DL denotes the Form I qualifier supplied by the laboratory
 QL denotes the qualifier used by the data validation firm
 + in the DL column denotes a positive result
 - in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8270C for GC/MS Semivolatiles; the National Functional Guidelines for Organic Data Validation, 2/94, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # EN022

A validation was performed on the Semivolatile Data from SDG EN022. The data was evaluated based on the following parameters:

- * • Data Completeness
- * • Holding Times
- * • GC/MS Tuning
- Calibration
- * • Blanks
- * • Internal Standard Performance
- * • Surrogate Recoveries
- * • Matrix Spike/Matrix Spike Duplicates
- * • Field Duplicates
- * • Compound Identification
- * • Compound Quantitation

* - All criteria were met for this parameter.

Calibrations

The initial calibration analyzed 10/11/99 on Instrument 5970Z exhibited two (2) compounds with %RSDs greater than 15% for which qualifications were required. For the following samples and non-compliant compounds, the reported positive results are qualified as estimated, J.

620SB01401

2-methylnaphthalene (15.1%)

**DATA ASSESSMENT NARRATIVE
SEMIVOLATILE ORGANICS**

PAGE 2

Calibrations (continued)

The initial calibration analyzed 10/11/99 on Instrument 5970Z exhibited two (2) compounds with %RSDs greater than 15% for which qualifications were required. For the following samples and non-compliant compounds, the reported positive results are qualified as estimated, J.

609SB001T1	benzo(k)fluoranthene (19.0%)
620SB008T1	
620SB01301	

The continuing calibration standard Z1027002.D exhibited one (1) compound with a %D greater than 50% but less than 90%. For the following samples and non-compliant compound, the reported positive and non-detect results are qualified as estimated, J/UJ.

607SB008T2	2,4-dinitrophenol (54.9%)
607SB016T2	
607SB008T1	
620SB008T1	
620SB01301	
620SB01302	
620SB01401	
620SB01402	
620SB01201	

The continuing calibration standard Z1028003.D exhibited one (1) compound with a %D greater than 20% but less than 50% for which qualifications were required. For the following samples and non-compliant compound, the reported positive results are qualified as estimated, J.

609SB001T1	indeno(1,2,3-cd)pyrene (21.8%)
609SB001T2	

System Performance and Overall Assessment

The data, as reported, required qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

L = Result is estimated and biased low.

K = Result is estimated and biased high.

R = Result is rejected and unusable

D = Result value is based on dilution analysis

BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that compound is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

<u>SAMPLE ID</u>	<u>COMPOUND ID</u>	<u>DL</u>	<u>QL</u>
620SB01401	2-methylnaphthalene (15.1%)	+	J
609SB001T1 620SB008T1 620SB01301	benzo(k)fluoranthene (19.0%)	+	J
607SB008T2 607SB016T2 607SB008T1 620SB008T1 620SB01301 620SB01302 620SB01401 620SB01402 620SB01201	2,4-dinitrophenol (54.9%)	+/-	J/UJ
609SB001T1 609SB001T2	indeno(1,2,3-cd)pyrene (21.8%)	+	J

- * DL denotes the Form I qualifier supplied by the laboratory
 QL denotes the qualifier used by the data validation firm
 + in the DL column denotes a positive result
 - in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

PESTICIDE/AROCLORS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW846 Method 8081A/8082; the National Functional Guidelines for Organic Data Validation, February 1994; and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # EN022

A validation was performed on the Pesticide/Aroclor Data from SDG EN022. The data was evaluated based on the following parameters:

- * • Data Completeness
- * • Holding Times
- * • GC Performance
- Calibration
- * • Blanks
- Surrogate Recoveries
- * • Matrix Spike/Matrix Spike Duplicates
- * • Field Duplicates
- * • Compound Identification
- Compound Quantitation

* - All criteria were met for this parameter.

DATA ASSESSMENT NARRATIVE

PESTICIDE/AROCOR ANALYSIS

PAGE - 2

Continuing Calibrations

The continuing calibration analyzed on 10/27/99 at 16:37 exhibited three (3) compounds with %Ds greater than 15% and less than 50% and required qualifications. For the following samples and non-compliant compounds, the positive results are qualified as estimated, J.

620SB008T1	Alpha-Chlordane (-16.5%) Gamma-Chlordane (-15.5)
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620SB008T1 607SB008T1DL 609SB001T2	4,4'-DDE (-15.2)
--	------------------

Surrogate Recoveries

The sample listed below exhibited a high DCB recovery. The positive results are qualified as estimated, J.

<u>Sample ID</u>	<u>Surrogate</u>	<u>% Recovery</u>
607SB008T1DL	DCB	193%

Compound Quantitation

Several samples exhibited column quantitation %Ds greater than 40%. The following guidelines were used to qualify the data:

1. No qualifications are required for positive sample results which exhibited column quantitation differences < 40%. The "P" flag is removed from the result.
2. The positive sample result which exhibited a column quantitation difference > 40%, but ≤ 100% is qualified as estimated, J.
3. The positive single component pesticide sample result which exhibited a column quantitation difference > 100% and is < 10X the respective compound CRQL, is qualified as non-detect, U. (All multi-component results are exempt from this rule.)

DATA ASSESSMENT NARRATIVE

PESTICIDE/AROCLOR ANALYSIS

PAGE - 3

Compound Quantitation, Continued

4. The positive single component pesticide sample result which exhibited a column quantitation difference $> 100\%$ and $> 10X$ the respective compound CRQL, is qualified as presumptively present at an estimated concentration, NJ. (All multi-component results are exempt from this rule.)
5. The positive multi-component pesticide sample result which exhibited a column quantitation difference $> 100\%$ and $< 10\%$ the respective multi-component CRQL is qualified as presumptively present at an estimated concentration, NJ.

The following samples and compounds have been qualified for high column quantitation %Ds.

<u>Sample ID</u>	<u>Compound</u>	<u>%D</u>	<u>Lab Qual.</u>	<u>HESI Qual.</u>	<u>Ref. #</u>
620SB008T1	Alpha-Chlordane	31.8%	P		1
607SB008T1	Alpha-Chlordane	34.6%	P		1
609SB001T2	4,4'-DDE	33.8%	P		1

Two (2) samples were diluted to accurately quantitate target compounds. For the following samples, the results for the E-flagged compounds are replaced with the corresponding results from the dilution analysis. All other results from the dilution analysis are not used.

607SB008T1
609SB001T1

System Performance and Overall Assessment

The data required qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

NJ = Result is considered presumptively present at an estimated concentration

UR = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 5X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that compound is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 5X the method blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 5X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

<u>SAMPLE ID</u>	<u>COMPOUND ID</u>	<u>DL</u>	<u>QL</u>
620SB008T1	Alpha-Chlordane Gamma-Chlordane	+	J
620SB008T1 607SB008T1DL 609SB001T2	4,4'-DDE	+	J
607SB008T1DL	ALL	+	J
ALL	All P < 40 %	+	
ALL	All P > 40 % But ≤ 100 %	+	J
ALL	single component pests All P > 100 % And < 10X CRQL	+	U
ALL	single component pests All P > 100 % And > 10X CRQL	+	NJ
ALL	multi-component pests All P > 100 % And < 10X CRQL	+	NJ
607SB008T1 609SB001T1	All E-Flagged	+E	D
607SB008T1DL 609SB001T1DL	All except corresponding D-Flagged results	+/-	not used

- * DL denotes the Form I qualifier supplied by the laboratory
 QL denotes the qualifier used by the data validation firm
 + in the DL column denotes a positive result
 - in the DL column denotes a non-detect result

DATA ASSESSMENT NARRATIVE METALS (SOILS AND SPLP), CYANIDE AND TOC

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW846 methods: the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDGs # EN022

A validation was performed on the Metals for soils and SPLP, cyanide and TOC Data from SDG EN022. The data was evaluated based on the following parameters.

- * ● Data Completeness
- * ● Holding Times
- * ● Calibrations
- Blanks
- * ● Interferences
- Matrix Spike Recovery
- * ● Matrix Duplicates
- * ● Field Duplicates
- * ● Laboratory Control Samples
- Serial Dilutions

* - All criteria were met for this parameter.

Preparation and Field Blanks

The preparation and calibration blanks exhibited contamination for the following elements.

<u>Elements</u>	<u>Conc.</u>	<u>Samples affected</u>
Barium	0.05 mg/kg	no impact
Zinc	0.17 mg/kg	no impact
Cadmium	0.4 ug/l	all SPLP samples below 2.0 ug/l
Iron	31.9 ug/l	all SPLP samples below 160 ug/l
Lead	2.7 ug/l	all SPLP samples below 13.5 ug/l
Magnesium	17.4 ug/l	no impact
Selenium	1.9 ug/l	all SPLP samples below 9.5 ug/l

Zinc 7.5 ug/l all SPLP samples below 37.5 ug/l

The USEPA requires that all sample values below five times the preparation or calibration blank contamination be qualified as non-detect, "U".

The preparation blanks exhibited negative bias for the following elements.

<u>Elements</u>	<u>Conc.</u>	<u>Samples affected</u>
Cadium	-0.06 mg/kg	all soil samples below 0.6 mg/kg
Calcium	-3.44 mg/kg	no impact
Magnesium	-2.38 mg/kg	no impact
Thallium	-0.29 mg/kg	all soil samples below 2.9 mg/kg
Aluminum	-63.6 ug/l	all SPLP samples below 636 ug/l
Cobalt	-0.50 ug/l	all SPLP samples below 5.0 ug/l
Thallium	-6.9 ug/l	all SPLP samples below 69.0 ug/l

This reviewer qualifies all samples results below 10 times the absolute value of the negative blank value.

Matrix Spike Recovery results

The matrix spike recovery for SPLPs for Merccury (20%) was below 30%. All positive results are qualified as estimated, "J" and all non-detect results are rejected, "UR".

The matrix spike recoveries for soils for Antimony (47%), Chromium (52%) and Zinc (68%) and SPLPs for Silver (56%) were below the lower control limits (>30% but <75%). All positive and non-detect results are qualified as estimated, "J" or "UJ".

The matrix spike recovery for SPLPs for Selenium (133%) was above the upper control limits (>125%). All positive results are qualified as estimated, "J"

Matrix Duplicate results

The matrix duplicate RPD results for soils for Chromium (34%) and Merccury (21%) were not greater than 35% and will not be qualified.

Serial Dilution recovery results

The serial dilution results for soils for Arsenic, Calcium, and Potassium were greater than 10%. All positive results are qualified as estimated, "J".

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B". Value is below the CRDL but greater than the IDL.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
all SPLP samples below 2.0 ug/l	Cd.	+	U
all SPLP samples below 160 ug/l	Fe.		
all SPLP samples below 13.5 ug/l	Pb.		
all SPLP samples below 9.5 ug/l	Se.		
all SPLP samples below 37.5 ug/l	Zn.		
all soil samples below 0.6 mg/kg	Cd.	+/U	J/UJ
all soil samples below 2.9 mg/kg	Tl.		
all SPLP samples below 636 ug/l	Al.		
all SPLP samples below 5.0 ug/l	Co.		
all SPLP samples below 69.0 ug/l	Tl.		
all SPLP samples	Hg.	+	J
		U	UR
all soil samples	Sb, Cr and Zn.	+/U	J/UJ
all SPLP samples	Ag.		
all SPLP samples	Se.	+	J
all soil samples	Ca, As, Mg and K.	+	J
all "B" results	all analytes	B	J



HEARTLAND

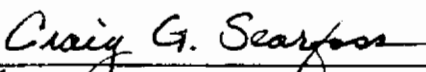
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#: EN023
Date: November 29, 1999
Client Name: Ensafe
Project/Site Name: Charleston Zone F
Date Sampled: October 15, 1999
Number of Samples: 22 Non-Aqueous Sample(s) with 0 MS/MSD(s)
3 Aqueous Sample(s) with 0 MS/MSD(s)
Laboratory: Laucks Testing Laboratories
Validation Guidance: National Functional Guidelines for Organic and Inorganic Data,
February, 1994
QA/QC Level: DQO Level III
Method(s) Utilized: SW846 Third Edition
Analytical Fractions: Volatiles, SPLP Volatiles, Semivolatiles, SPLP Semivolatiles,
Pesticides/PCBs, SPLP Pesticides/PCBs, Metals, SPLP Metals,
Cyanide, SPLP Cyanide and Total Organic Carbon

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user is urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:


Paul B. Humburg, President

12-2-99.
Date

SDG# EN023

Samples and Fractions Reviewed

Sample Identifications

Analytical Fractions

ENSAFE ID	MATRIX	VOA		SPLP-V		SVOA		SPLP-SV		P/P		SPLP-P/P		MET		SPLP-MET		CN		SPLP-CN		TOC	
109SB001T1	SOIL		X				X				X				X				X				X
109SB001T2	SOIL		X				X				X				X				X				X
109SB01001	SOIL														X								
109SB01002	SOIL														X								
613SB01101	SOIL						X								X								
613SB01102	SOIL						X								X								
613SP051T1	SOIL		X				X				X				X				X				X
613SP051T2	SOIL		X				X				X				X				X				X
619SB01601	SOIL						X																
619SB01602	SOIL						X																
619SB01701	SOIL						X																
619SB01702	SOIL						X																
619SB01801	SOIL						X																
619SB01802	SOIL						X																
619SB02001	SOIL						X																
619SB02002	SOIL						X																
620SB008T2	SOIL		X				X				X				X				X				X
620TB01201	WATER	X																					
620EB01201	WATER	X					X				X				X				X				
620FB01201	WATER	X					X				X				X				X				
109SB001S1	SOIL				X				X				X				X				X		
109SB001S2	SOIL				X				X				X				X				X		
613SP051S1	SOIL				X				X				X				X				X		
613SP051S2	SOIL				X				X				X				X				X		
620SB008S2	SOIL				X				X				X				X				X		
Total Billable Samples (Water/Soil)		3	5	0	5	2	15	0	5	2	5	0	5	2	9	0	5	2	5	0	5	0	5

VOA= Volatiles
 SPLP-V= SPLP Volatiles
 SVOA= Semivolatiles
 SPLP-SV= SPLP Semivolatiles
 P/P= Pesticides/PCBs
 SPLP-P/P= SPLP Pesticides/PCBs

MET= Metals
 SPLP-MET= SPLP Metals
 CN= Cyanide
 SPLP-CN= SPLP Cyanide
 TOC= Total Organic Carbon

CHARLESTON - ZONE F
CHARLESTON ZONE F SOIL (ONLY)
SDG# EN023

6-SVQA		SAMPLE ID ----->	613-S-P051-T1 DL	613-S-P051-T2	619-S-B016-01	619-S-B016-02	619-S-B017-01	619-S-B017-02
		ORIGINAL ID ----->	613SP051T1	613SP051T2	619SB01601	619SB01602	619SB01701	619SB01702
		LAB SAMPLE ID ---->	991043615DL	9910436-17	9910436-09	9910436-10	9910436-07	9910436-08
		ID FROM REPORT -->	613SP051T1	613SP051T2	619SB01601	619SB01602	619SB01701	619SB01702
		SAMPLE DATE ----->	10/15/99	10/15/99	10/15/99	10/15/99	10/15/99	10/15/99
		DATE EXTRACTED -->	10/19/99	10/19/99	10/19/99	10/19/99	10/19/99	10/19/99
		DATE ANALYZED ---->	10/29/99	10/28/99	10/29/99	10/28/99	10/28/99	10/29/99
		MATRIX ----->	Soil	Soil	Soil	Soil	Soil	Soil
		UNITS ----->	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
			C	A	A	A	A	A
CAS #	Parameter	EN023	EN023	EN023	EN023	EN023	EN023	EN023
08-95-2	Phenol	1800. U	640. U	410. U	470. U	370. U	410. U	
11-44-4	bis(2-Chloroethyl)ether	1800. U	640. U	410. U	470. U	370. U	410. U	
95-57-8	2-Chlorophenol	1800. U	640. U	410. U	470. U	370. U	410. U	
41-73-1	1,3-Dichlorobenzene	1800. U	640. U	410. U	470. U	370. U	410. U	
06-46-7	1,4-Dichlorobenzene	1800. U	640. U	410. U	470. U	370. U	410. U	
00-51-6	Benzyl alcohol	1800. U	640. U	410. U	470. U	370. U	410. U	
95-50-1	1,2-Dichlorobenzene	1800. U	640. U	410. U	470. U	370. U	410. U	
95-48-7	2-Methylphenol (o-Cresol)	1800. U	640. U	410. U	470. U	370. U	410. U	
08-60-1	2,2'-oxybis(1-Chloropropane)	1800. U	640. U	410. U	470. U	370. U	410. U	
06-44-5	4-Methylphenol (p-Cresol)	1800. U	640. U	410. U	470. U	370. U	410. U	
21-64-7	N-Nitroso-di-n-propylamine	1800. U	640. U	410. U	470. U	370. U	410. U	
67-72-1	Hexachloroethane	1800. U	640. U	410. U	470. U	370. U	410. U	
98-95-3	Nitrobenzene	1800. U	640. U	410. U	470. U	370. U	410. U	
78-59-1	Isophorone	1800. U	640. U	410. U	470. U	370. U	410. U	
98-75-5	2-Nitrophenol	1800. U	640. U	410. U	470. U	370. U	410. U	
05-67-9	2,4-Dimethylphenol	1800. U	640. U	410. U	470. U	370. U	410. U	
55-85-0	Benzoic acid	8800. U	3200. U	2000. U	2300. U	1900. U	2000. U	
11-91-1	bis(2-Chloroethoxy)methane	1800. U	640. U	410. U	470. U	370. U	410. U	
20-83-2	2,4-Dichlorophenol	1800. U	640. U	410. U	470. U	370. U	410. U	
20-82-1	1,2,4-Trichlorobenzene	1800. U	640. U	410. U	470. U	370. U	410. U	
21-20-3	Naphthalene	1800. U	640. U	410. U	470. U	370. U	410. U	
26-47-8	4-Chloroaniline	1800. U	640. U	410. U	470. U	370. U	410. U	
17-68-3	Hexachlorobutadiene	1800. U	640. U	410. U	470. U	370. U	410. U	
99-50-7	4-Chloro-3-methylphenol	1800. U	640. U	410. U	470. U	370. U	410. U	
11-57-6	2-Methylnaphthalene	1800. U	640. U	410. U	470. U	370. U	410. U	
7-47-4	Hexachlorocyclopentadiene	1800. U	640. U	410. U	470. U	370. U	410. U	
18-06-2	2,4,6-Trichlorophenol	1800. U	640. U	410. U	470. U	370. U	410. U	
15-95-4	2,4,5-Trichlorophenol	1800. U	640. U	410. U	470. U	370. U	410. U	
11-58-7	2-Chloronaphthalene	1800. U	640. U	410. U	470. U	370. U	410. U	
8-74-4	2-Nitroaniline	1800. U	640. U	410. U	470. U	370. U	410. U	
1-11-3	Dimethyl phthalate	1800. U	640. U	410. U	470. U	370. U	410. U	
1-26-8	Acenaphthylene	1800. U	640. U	410. U	470. U	370. U	410. U	
29-2	3-Nitroaniline	1800. U	640. U	410. U	470. U	370. U	410. U	
9-02-9	Acenaphthene	1800. U	640. U	410. U	470. U	370. U	410. U	
10-65-5	2,4-Dinitrophenol	3500. U	1300. U	810. U	940. U	750. U	810. U	
10-65-7	4-Nitrophenol	3500. U	1300. U	810. U	940. U	750. U	810. U	

CHARLESTON - ZONE F
CHARLESTON ZONE F SOIL (ONLY)
SDG# EN023

Page: 21
Time: 15:22

SVOA		SAMPLE ID ----->	613-S-P051-T1 DL	613-S-P051-T2	619-S-B016-01	619-S-B016-02	619-S-B017-01	619-S-B017-02
		ORIGINAL ID ----->	613SP051T1	613SP051T2	619SB01601	619SB01602	619SB01701	619SB01702
		LAB SAMPLE ID ---->	9910436150L	9910436-17	9910436-09	9910436-10	9910436-07	9910436-08
		ID FROM REPORT -->	613SP051T1	613SP051T2	619SB01601	619SB01602	619SB01701	619SB01702
		SAMPLE DATE ----->	10/15/99	10/15/99	10/15/99	10/15/99	10/15/99	10/15/99
		DATE EXTRACTED -->	10/19/99	10/19/99	10/19/99	10/19/99	10/19/99	10/19/99
		DATE ANALYZED ---->	10/29/99	10/28/99	10/29/99	10/28/99	10/28/99	10/29/99
		MATRIX ----->	Soil	Soil	Soil	Soil	Soil	Soil
		UNITS ----->	UG/KG C	UG/KG A	UG/KG A	UG/KG A	UG/KG A	UG/KG A
CAS #	Parameter	EN023	EN023	EN023	EN023	EN023	EN023	EN023
-95-2	Phenol	1800. U	640. U	410. U	470. U	370. U	410. U	
-44-4	bis(2-Chloroethyl)ether	1800. U	640. U	410. U	470. U	370. U	410. U	
-57-8	2-Chlorophenol	1800. U	640. U	410. U	470. U	370. U	410. U	
-73-1	1,3-Dichlorobenzene	1800. U	640. U	410. U	470. U	370. U	410. U	
-46-7	1,4-Dichlorobenzene	1800. U	640. U	410. U	470. U	370. U	410. U	
-51-6	Benzyl alcohol	1800. U	640. U	410. U	470. U	370. U	410. U	
-50-1	1,2-Dichlorobenzene	1800. U	640. U	410. U	470. U	370. U	410. U	
-48-7	2-Methylphenol (o-Cresol)	1800. U	640. U	410. U	470. U	370. U	410. U	
-60-1	2,2'-oxybis(1-Chloropropane)	1800. U	640. U	410. U	470. U	370. U	410. U	
-44-5	4-Methylphenol (p-Cresol)	1800. U	640. U	410. U	470. U	370. U	410. U	
-64-7	N-Nitroso-di-n-propylamine	1800. U	640. U	410. U	470. U	370. U	410. U	
-72-1	Hexachloroethane	1800. U	640. U	410. U	470. U	370. U	410. U	
-95-3	Nitrobenzene	1800. U	640. U	410. U	470. U	370. U	410. U	
-59-1	Isophorone	1800. U	640. U	410. U	470. U	370. U	410. U	
-75-5	2-Nitrophenol	1800. U	640. U	410. U	470. U	370. U	410. U	
-67-9	2,4-Dimethylphenol	1800. U	640. U	410. U	470. U	370. U	410. U	
-85-0	Benzoic acid	8800. U	3200. U	2000. U	2300. U	1900. U	2000. U	
-91-1	bis(2-Chloroethoxy)methane	1800. U	640. U	410. U	470. U	370. U	410. U	
-83-2	2,4-Dichlorophenol	1800. U	640. U	410. U	470. U	370. U	410. U	
-82-1	1,2,4-Trichlorobenzene	1800. U	640. U	410. U	470. U	370. U	410. U	
-20-3	Naphthalene	1800. U	640. U	410. U	470. U	370. U	410. U	
-47-8	4-Chloroaniline	1800. U	640. U	410. U	470. U	370. U	410. U	
-68-3	Hexachlorobutadiene	1800. U	640. U	410. U	470. U	370. U	410. U	
-50-7	4-Chloro-3-methylphenol	1800. U	640. U	410. U	470. U	370. U	410. U	
-57-6	2-Methylnaphthalene	1800. U	640. U	410. U	470. U	370. U	410. U	
-47-4	Hexachlorocyclopentadiene	1800. U	640. U	410. U	470. U	370. U	410. U	
-06-2	2,4,6-Trichlorophenol	1800. U	640. U	410. U	470. U	370. U	410. U	
-95-4	2,4,5-Trichlorophenol	1800. U	640. U	410. U	470. U	370. U	410. U	
-58-7	2-Chloronaphthalene	1800. U	640. U	410. U	470. U	370. U	410. U	
-74-4	2-Nitroaniline	1800. U	640. U	410. U	470. U	370. U	410. U	
-11-3	Dimethyl phthalate	1800. U	640. U	410. U	470. U	370. U	410. U	
-26-8	Acenaphthylene	1800. U	640. U	410. U	470. U	370. U	410. U	
-09-2	3-Nitroaniline	1800. U	640. U	410. U	470. U	370. U	410. U	
-22-9	Acenaphthene	1800. U	640. U	410. U	470. U	370. U	410. U	
-08-5	2,4-Dinitrophenol	3500. U	1300. U	810. U	940. U	750. U	810. U	
-02-7	4-Nitrophenol	3500. U	1300. U	810. U	940. U	750. U	810. U	

CHARLESTON - ZONE F
CHARLESTON ZONE F SOIL (ONLY)
SDG# EN023

6-SVOA		SAMPLE ID ----->	613-S-P051-T1 DL	613-S-P051-T2	619-S-B016-01	619-S-B016-02	619-S-B017-01	619-S-B017-02
		ORIGINAL ID ----->	613SP051T1	613SP051T2	619SB01601	619SB01602	619SB01701	619SB01702
		LAB SAMPLE ID ---->	991043615DL	9910436-17	9910436-09	9910436-10	9910436-07	9910436-08
		ID FROM REPORT -->	613SP051T1	613SP051T2	619SB01601	619SB01602	619SB01701	619SB01702
		SAMPLE DATE ----->	10/15/99	10/15/99	10/15/99	10/15/99	10/15/99	10/15/99
		DATE EXTRACTED -->	10/19/99	10/19/99	10/19/99	10/19/99	10/19/99	10/19/99
		DATE ANALYZED ---->	10/29/99	10/28/99	10/29/99	10/28/99	10/28/99	10/29/99
		MATRIX ----->	Soil	Soil	Soil	Soil	Soil	Soil
		UNITS ----->	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
CAS #	Parameter	EN023	EN023	EN023	EN023	EN023	EN023	EN023
32-64-9	Dibenzofuran	1800.	640. U	410. U	470. U	370. U	410. U	
21-14-2	2,4-Dinitrotoluene	1800.	640. U	410. U	470. U	370. U	410. U	
06-20-2	2,6-Dinitrotoluene	1800.	640. U	410. U	470. U	370. U	410. U	
04-66-2	Diethylphthalate	1800.	640. U	410. U	470. U	370. U	410. U	
05-72-3	4-Chlorophenylphenylether	1800.	640. U	410. U	470. U	370. U	410. U	
06-73-7	Fluorene	1800.	640. U	410. U	470. U	370. U	410. U	
00-01-6	4-Nitroaniline	1800.	640. U	410. U	470. U	370. U	410. U	
34-52-1	2-Methyl-4,6-Dinitrophenol	3500.	1300. U	810. U	940. U	750. U	810. U	
06-30-6	N-Nitrosodiphenylamine	1800.	640. U	410. U	470. U	370. U	410. U	
01-55-3	4-Bromophenyl-phenylether	1800.	640. U	410. U	470. U	370. U	410. U	
18-74-1	Hexachlorobenzene	1800.	640. U	410. U	470. U	370. U	410. U	
07-88-5	Pentachlorophenol	3500.	1300. U	810. U	940. U	750. U	810. U	
05-01-8	Phenanthrene	1800.	640. U	410. U	470. U	120. J	410. U	
20-12-7	Anthracene	1800.	640. U	410. U	470. U	370. U	410. U	
34-74-2	Di-n-butylphthalate	1800.	640. U	410. U	470. U	370. U	410. U	
26-44-0	Fluoranthene	1800.	640. U	410. U	150. J	150. J	410. U	
29-00-0	Pyrene	1800.	180. J	410. U	140. J	140. J	410. U	
15-68-7	Butylbenzylphthalate	1800.	640. U	410. U	470. U	370. U	410. U	
11-94-1	3,3'-Dichlorobenzidine	3500.	1300. U	810. U	940. U	750. U	810. U	
6-55-3	Benzo(a)anthracene	1800.	640. U	410. U	470. U	99. J	410. U	
7-81-7	bis(2-Ethylhexyl)phthalate (BEHP)	1800.	640. U	410. U	470. U	230. J	250. J	
8-01-9	Chrysene	1800.	640. U	410. U	120. J	130. J	410. U	
7-84-0	Di-n-octyl phthalate	1800.	640. U	410. U	470. U	370. U	410. U	
5-99-2	Benzo(b)fluoranthene	1800.	640. U	410. U	96. J	130. J	410. U	
7-08-9	Benzo(k)fluoranthene	1800.	640. U	410. U	120. J	83. J	410. U	
3-32-8	Benzo(a)pyrene	1800.	640. U	410. U	100. J	94. J	410. U	
5-39-5	Indeno(1,2,3-cd)pyrene	1800.	640. U	410. U	470. U	370. U	410. U	
3-70-3	Dibenz(a,h)anthracene	1800.	640. U	410. U	470. U	370. U	410. U	
1-24-2	Benzo(g,h,i)perylene	1800.	640. U	410. U	470. U	370. U	410. U	

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CHARLESTON - ZONE F
CHARLESTON ZONE F SOIL (ONLY)
SDG# EN023

-SV0A		SAMPLE ID ----->	619-S-B018-01	619-S-B018-02	619-S-B020-01	619-S-B020-02	620-S-B008-T2	620-E-B012-01
		ORIGINAL ID ----->	619S801801	619S801802	619S802001	619S802002	620S8008T2	620E801201
		LAB SAMPLE ID ---->	9910436-03	9910436-04	9910436-05	9910436-06	9910439-01	9910436-21
		ID FROM REPORT -->	619S801801	619S801802	619S802001	619S802002	620S8008T2	620E801201
		SAMPLE DATE ----->	10/15/99	10/15/99	10/15/99	10/15/99	10/15/99	10/15/99
		DATE EXTRACTED -->	10/19/99	10/19/99	10/19/99	10/19/99	10/19/99	10/19/99
		DATE ANALYZED ---->	10/28/99	10/28/99	10/28/99	10/28/99	10/29/99	10/27/99
		MATRIX ----->	Soil	Soil	Soil	Soil	Soil	Water
		UNITS ----->	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/L
			A	A	A	A	A	B
CAS #	Parameter	EN023	EN023	EN023	EN023	EN023	EN023	EN023
8-95-2	Phenol	360. U	400. U	370. U	400. U	480. U	5. U	
1-44-4	bis(2-Chloroethyl)ether	360. U	400. U	370. U	400. U	480. U	5. U	
5-57-8	2-Chlorophenol	360. U	400. U	370. U	400. U	480. U	5. U	
1-73-1	1,3-Dichlorobenzene	360. U	400. U	370. U	400. U	480. U	5. U	
1-46-7	1,4-Dichlorobenzene	360. U	400. U	370. U	400. U	480. U	5. U	
0-51-6	Benzyl alcohol	360. U	400. U	370. U	400. U	480. U	5. U	
5-50-1	1,2-Dichlorobenzene	360. U	400. U	370. U	400. U	480. U	5. U	
5-48-7	2-Methylphenol (o-Cresol)	360. U	400. U	370. U	400. U	480. U	5. U	
8-60-1	2,2'-oxybis(1-Chloropropane)	360. U	400. U	370. U	400. U	480. U	5. U	
6-44-5	4-Methylphenol (p-Cresol)	360. U	400. U	370. U	400. U	480. U	5. U	
1-64-7	N-Nitroso-di-n-propylamine	360. U	400. U	370. U	400. U	480. U	5. U	
7-72-1	Hexachloroethane	360. U	400. U	370. U	400. U	480. U	5. U	
8-95-3	Nitrobenzene	360. U	400. U	370. U	400. U	480. U	5. U	
8-59-1	Isophorone	360. U	400. U	370. U	400. U	480. U	5. U	
8-75-5	2-Nitrophenol	360. U	400. U	370. U	400. U	480. U	5. U	
5-67-9	2,4-Dimethylphenol	360. U	400. U	370. U	400. U	480. U	5. U	
5-85-0	Benzoic acid	1800. U	2000. U	1900. U	2000. U	2400. U	26. U	
1-91-1	bis(2-Chloroethoxy)methane	360. U	400. U	370. U	400. U	480. U	5. U	
0-83-2	2,4-Dichlorophenol	360. U	400. U	370. U	400. U	480. U	5. U	
0-82-1	1,2,4-Trichlorobenzene	360. U	400. U	370. U	400. U	480. U	5. U	
1-20-3	Naphthalene	360. U	400. U	370. U	400. U	480. U	5. U	
6-47-8	4-Chloroaniline	360. U	400. U	370. U	400. U	480. U	5. U	
7-68-3	Hexachlorobutadiene	360. U	400. U	370. U	400. U	480. U	5. U	
9-50-7	4-Chloro-3-methylphenol	360. U	400. U	370. U	400. U	480. U	5. U	
1-57-6	2-Methylnaphthalene	360. U	400. U	370. U	400. U	480. U	5. U	
7-47-4	Hexachlorocyclopentadiene	360. U	400. U	370. U	400. U	480. U	5. U	
8-06-2	2,4,6-Trichlorophenol	360. U	400. U	370. U	400. U	480. U	5. U	
5-95-4	2,4,5-Trichlorophenol	360. U	400. U	370. U	400. U	480. U	5. U	
1-58-7	2-Chloronaphthalene	360. U	400. U	370. U	400. U	480. U	5. U	
8-74-4	2-Nitroaniline	360. U	400. U	370. U	400. U	480. U	5. U	
1-11-3	Dimethyl phthalate	360. U	400. U	370. U	400. U	480. U	5. U	
8-94-8	Acenaphthylene	360. U	400. U	370. U	400. U	480. U	5. U	
9-09-2	3-Nitroaniline	360. U	400. U	370. U	400. U	480. U	5. U	
3-32-9	Acenaphthene	360. U	400. U	370. U	400. U	710. U	5. U	
28-5	2,4-Dinitrophenol	720. U	790. U	750. U	800. U	950. U	10. U	
02-7	4-Nitrophenol	720. U	790. U	750. U	800. U	950. U	10. U	

CHARLESTON - ZONE F
CHARLESTON ZONE F SOIL (ONLY)
SDG# EN023

46-SV0A

SAMPLE ID ----->	619-S-B018-01	619-S-B018-02	619-S-B020-01	619-S-B020-02	620-S-B008-T2	620-E-B012-01
ORIGINAL ID ----->	619S01801	619S01802	619S02001	619S02002	620S008T2	620EB01201
LAB SAMPLE ID ----->	9910436-03	9910436-04	9910436-05	9910436-06	9910439-01	9910436-21
ID FROM REPORT ----->	619S01801	619S01802	619S02001	619S02002	620S008T2	620EB01201
SAMPLE DATE ----->	10/15/99	10/15/99	10/15/99	10/15/99	10/15/99	10/15/99
DATE EXTRACTED ----->	10/19/99	10/19/99	10/19/99	10/19/99	10/19/99	10/19/99
DATE ANALYZED ----->	10/28/99	10/28/99	10/28/99	10/28/99	10/29/99	10/27/99
MATRIX ----->	Soil	Soil	Soil	Soil	Soil	Water
UNITS ----->	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/L

CAS #	Parameter	EN023	EN023	EN023	EN023	EN023	EN023
132-64-9	Dibenzofuran	360. U	400. U	370. U	400. U	120. J	5. U
121-14-2	2,4-Dinitrotoluene	360. U	400. U	370. U	400. U	480. U	5. U
606-20-2	2,6-Dinitrotoluene	360. U	400. U	370. U	400. U	480. U	5. U
84-66-2	Diethylphthalate	360. U	400. U	370. U	400. U	480. U	5. U
005-72-3	4-Chlorophenylphenylether	360. U	400. U	370. U	400. U	480. U	5. U
86-73-7	Fluorene	360. U	400. U	370. U	400. U	480. U	5. U
100-01-6	4-Nitroaniline	360. U	400. U	370. U	400. U	480. U	5. U
534-52-1	2-Methyl-4,6-Dinitrophenol	720. U	790. U	750. U	800. U	950. U	10. U
86-30-6	N-Nitrosodiphenylamine	360. U	400. U	370. U	400. U	480. U	5. U
101-55-3	4-Bromophenyl-phenylether	360. U	400. U	370. U	400. U	480. U	5. U
118-74-1	Hexachlorobenzene	360. U	400. U	370. U	400. U	480. U	5. U
87-86-5	Pentachlorophenol	720. U	790. U	750. U	800. U	950. U	10. U
85-01-8	Phenanthrene	360. U	400. U	370. U	400. U	480. U	5. U
120-12-7	Anthracene	360. U	400. U	370. U	400. U	480. U	5. U
84-74-2	Di-n-butylphthalate	360. U	400. U	370. U	400. U	480. U	5. U
206-44-0	Fluoranthene	360. U	400. U	370. U	400. U	150. J	5. U
129-00-0	Pyrene	360. U	400. U	370. U	400. U	150. J	5. U
85-68-7	Butylbenzylphthalate	360. U	400. U	370. U	400. U	480. U	5. U
91-94-1	3,3'-Dichlorobenzidine	720. U	790. U	750. U	800. U	950. U	10. U
56-55-3	Benzo(a)anthracene	360. U	400. U	370. U	400. U	480. U	5. U
117-81-7	bis(2-Ethylhexyl)phthalate (BEHP)	360. U	400. U	370. U	260. J	480. U	5. U
218-01-9	Chrysene	360. U	400. U	370. U	400. U	95. J	5. U
117-84-0	Di-n-octyl phthalate	360. U	400. U	370. U	400. U	480. U	5. U
205-99-2	Benzo(b)fluoranthene	360. U	400. U	370. U	400. U	120. J	5. U
207-08-9	Benzo(k)fluoranthene	360. U	400. U	370. U	400. U	97. J	5. U
50-32-8	Benzo(a)pyrene	360. U	400. U	370. U	400. U	100. J	5. U
195-39-5	Indeno(1,2,3-cd)pyrene	360. U	400. U	370. U	400. U	480. U	5. U
55-70-3	Dibenz(a,h)anthracene	360. U	400. U	370. U	400. U	480. U	5. U
191-24-2	Benzo(g,h,i)perylene	360. U	400. U	370. U	400. U	480. U	5. U



HEARTLAND

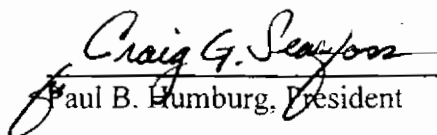
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#: EN028
Date: December 16, 1999
Client Name: Ensafe
Project/Site Name: Charleston Zone F
Date Sampled: November 16 - 17, 1999
Number of Samples: 20 Non-Aqueous Sample(s) with 0 MS/MSD(s)
3 Aqueous Sample(s) with 0 MS/MSD(s)
Laboratory: Laucks Testing Laboratories
Validation Guidance: National Functional Guidelines for Organic and Inorganic Data,
February, 1994
QA/QC Level: EPA DQO Level III
Method(s) Utilized: SW846 Third Edition
Analytical Fractions: Semivolatiles and Metals

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user is urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:


Paul B. Humburg, President

12-21-99
Date

SDG# EN028

Samples and Fractions Reviewed

Sample Identifications

Analytical Fractions

ENSAFE ID	MATRIX	SVOA		MET	
613SB02501	SOIL		X		X
613SB02601	SOIL		X		X
613SB02602	SOIL		X		X
613CB02602	SOIL		X		X
613EB02602	WATER	X		X	
613FB02602	WATER	X		X	
613DB02602	WATER	X		X	
613SB02701	SOIL		X		X
613SB02702	SOIL		X		X
613SB02801	SOIL		X		X
613SB02802	SOIL		X		X
620SB01001	SOIL				X
620SB01002	SOIL				X
620SB01101	SOIL				X
620SB01102	SOIL				X
620SB01201	SOIL				X
620SB01202	SOIL				X
620SB01301	SOIL				X
620CB01301	SOIL				X
620SB01302	SOIL				X
620CB01302	SOIL				X
620SB01401	SOIL				X
620SB01402	SOIL				X
Total Billable Samples (Water/Soil)		3	8	3	20

SVOA= Semivolatiles

MET= Metals

CHARLESTON - ZONE F
CHARLESTON ZONE F SOIL
SDG# EN028

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SUBS-META		SAMPLE ID ----->	613-S-B025-01	613-S-B026-01	613-S-B026-02	613-C-B026-02	613-E-B026-02	613-F-B026-02
		ORIGINAL ID ----->	613SB02501	613SB02601	613SB02602	613CB02602	613EB02602	613FB02602
		LAB SAMPLE ID ---->	9911401-01	9911401-02	9911425-03	9911425-04	9911425-05	9911425-07
		ID FROM REPORT -->	613SB02501	613SB02601	613SB02602	613CB02602	613EB02602	613FB02602
		SAMPLE DATE ----->	11/16/99	11/16/99	11/17/99	11/17/99	11/17/99	11/17/99
		DATE EXTRACTED -->	11/29/99	11/29/99	11/22/99	11/22/99	11/30/99	11/30/99
		DATE ANALYZED ---->	11/30/99	11/30/99	11/23/99	11/23/99	11/30/99	11/30/99
		MATRIX ----->	Soil	Soil	Soil	Soil	Water	Water
		UNITS ----->	MG/KG	MG/KG	MG/KG	MG/KG	UG/L	UG/L
CAS #	Parameter	EN028	EN028	EN028	EN028	EN028	EN028	EN028
7429-90-5	Aluminum (Al)	17600.	22500.	33600.	28500.	58.7	U	58.7
7440-36-0	Antimony (Sb)	1.2	1.2	1.5	1.2	2.4	U	2.4
7440-38-2	Arsenic (As)	11.3	12.7	21.1	18.9	2.	U	2.
7440-39-3	Barium (Ba)	38.6	40.4	48.9	42.9	0.6	B	0.3
7440-41-7	Beryllium (Be)	1.1	1.2	1.7	1.6	0.9	U	0.9
7440-43-9	Cadmium (Cd)	0.03	0.03	0.04	0.04	0.3	U	0.3
7440-70-2	Calcium (Ca)	9450.	6580.	8410.	7200.	32.6	U	32.6
7440-47-3	Chromium (Cr)	31.4	34.4	52.1	45.2	0.6	U	0.6
7440-48-4	Cobalt (Co)	6.2	7.8	9.5	9.1	0.5	U	0.5
7440-50-8	Copper (Cu)	39.2	26.9	39.3	33.	0.6	U	0.6
7439-89-6	Iron (Fe)	18200.	25700.	34400.	31500.	21.2	UN	21.2
7439-92-1	Lead (Pb)	81.	52.6	6620.	1690.	2.1	B	2.1
7439-95-4	Magnesium (Mg)	2100.	2710.	4460.	3900.	13.6	U	13.6
7439-96-5	Manganese (Mn)	223.	263.	270.	309.	0.4	B	0.3
7439-97-6	Mercury (Hg)	0.63	0.28	0.36	0.36	0.2	U	0.2
7440-02-0	Nickel (Ni)	15.3	13.	18.1	15.7	1.1	U	1.1
7440-09-7	Potassium (K)	1220.	1830.	2880.	2530.	40.2	U	40.2
7782-49-2	Selenium (Se)	1.7	1.7	1.7	1.6	1.7	U	1.7
7440-22-4	Silver (Ag)	0.05	0.05	0.07	0.06	0.5	U	0.5
7440-23-5	Sodium (Na)	204.	426.	575.	525.	387.	U	387.
7440-28-0	Thallium (Tl)	0.97	0.25	0.82	0.29	2.4	B	2.4
7440-31-5	Tin (Sn)	6.1	5.9	8.	7.	2.7	U	2.7
7440-62-2	Vanadium (V)	42.8	56.3	75.2	70.8	0.5	U	0.5
7440-66-6	Zinc (Zn)	276.	98.7	184.	192.	2.2	B	2.4

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CHARLESTON - ZONE F
CHARLESTON ZONE F SOIL
SDG# EN028

SW846-META

SAMPLE ID ----->	613-D-B026-02	613-S-B027-01	613-S-B027-02	613-S-B028-01	613-S-B028-02	620-S-B010-01
ORIGINAL ID ----->	6130802602	613S802701	613S802702	613S802801	613S802802	620S801001
LAB SAMPLE ID ---->	9911425-06	9911401-03	9911401-04	9911401-05	9911401-06	9911425-01
ID FROM REPORT -->	613D102602	613S802701	613S802702	613S802801	613S802802	620S801001
SAMPLE DATE ----->	11/17/99	11/16/99	11/16/99	11/16/99	11/16/99	11/17/99
DATE EXTRACTED -->	11/30/99	11/29/99	11/29/99	11/29/99	11/29/99	11/22/99
DATE ANALYZED ---->	11/30/99	11/30/99	11/30/99	11/30/99	11/30/99	11/23/99
MATRIX ----->	Water	Soil	Soil	Soil	Soil	Soil
UNITS ----->	UG/L	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG

CAS #	Parameter	EN028	EN028	EN028	EN028	EN028	EN028
7429-90-5	Aluminum (Al)	58.7 U	28300.	6770.	30700.	6880.	5620.
7440-36-0	Antimony (Sb)	2.4 U	1.6	0.42	1.6	0.57	0.67
7440-38-2	Arsenic (As)	2. U	23.1	2.1	24.1	2.5	2.6
7440-39-3	Barium (Ba)	0.3 B	42.8	25.4	45.8	22.9	34.3
7440-41-7	Beryllium (Be)	0.9 U	1.6	0.48	1.8	0.36	0.16
7440-43-9	Cadmium (Cd)	0.3 U	0.03	0.02	0.03	0.02	0.03
7440-70-2	Calcium (Ca)	32.6 U	11800.	494.	6240.	483.	2360.
7440-47-3	Chromium (Cr)	0.6 U	47.1	6.	50.6	9.4	8.
7440-48-4	Cobalt (Co)	0.5 U	9.8	2.5	10.5	1.7	21.5
7440-50-8	Copper (Cu)	0.6 U	31.6	1.1	40.7	0.94	4.4
7439-89-6	Iron (Fe)	21.2 UN	35000.	3860.	39600.	6680.	4780.
7439-92-1	Lead (Pb)	2.1 U	47.5	5.	64.4	4.1	97.7
7439-95-4	Magnesium (Mg)	13.6 U	4640.	397.	4210.	481.	418.
7439-96-5	Manganese (Mn)	0.3 U	350.	27.4	467.	24.3	30.1
7439-97-6	Mercury (Hg)	0.2 U	0.34	0.04	0.5	0.04	0.05
7440-02-0	Nickel (Ni)	1.1 U	16.4	4.	17.9	3.9	6.2
7440-09-7	Potassium (K)	40.2 U	2720.	176.	2480.	242.	215.
7782-49-2	Selenium (Se)	1.7 U	1.7	0.42	2.3	0.82	0.51
7440-22-4	Silver (Ag)	0.5 U	0.05	0.04	0.05	0.04	0.41
7440-23-5	Sodium (Na)	387. U	441.	90.6	460.	106.	99.2
7440-28-0	Thallium (Tl)	2.4 U	0.25	0.18	0.47	0.18	0.23
7440-31-5	Tin (Sn)	2.7 U	6.8	3.	7.3	3.2	4.5
7440-62-2	Vanadium (V)	0.5 U	72.6	9.	83.9	14.9	23.6
7440-66-6	Zinc (Zn)	1.5 B	100.	9.2	126.	8.5	150.

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CHARLESTON - ZONE F
CHARLESTON ZONE F SOIL
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SW846-META		SAMPLE ID ----->	620-S-B010-02	620-S-B011-01	620-S-B011-02	620-S-B012-01	620-S-B012-02	620-S-B013-01
		ORIGINAL ID ----->	620S801002	620S801101	620S801102	620S801201	620S801202	620S801301
		LAB SAMPLE ID ----->	9911425-02	9911401-07	9911401-08	9911401-09	9911401-10	9911401-12
		ID FROM REPORT ----->	620S801002	620S801101	620S801102	620S801201	620S801202	620S801301
		SAMPLE DATE ----->	11/17/99	11/16/99	11/16/99	11/16/99	11/16/99	11/16/99
		DATE EXTRACTED ----->	11/22/99	11/29/99	11/29/99	11/29/99	11/29/99	11/29/99
		DATE ANALYZED ----->	11/23/99	11/30/99	11/30/99	11/30/99	11/30/99	11/30/99
		MATRIX ----->	Soil	Soil	Soil	Soil	Soil	Soil
		UNITS ----->	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG
CAS #	Parameter	EN028	EN028	EN028	EN028	EN028	EN028	EN028
7429-90-5	Aluminum (Al)	5970.	8450.	4740.	6120.	15400.	13000.	
7440-36-0	Antimony (Sb)	0.31	0.96	0.82	1.7	1.6	1.3	
7440-38-2	Arsenic (As)	1.1	4.8	2.9	27.3	16.1	12.4	
7440-39-3	Barium (Ba)	12.8	15.	11.5	21.9	44.3	30.8	
7440-41-7	Beryllium (Be)	0.16	0.33	0.19	0.33	1.1	0.69	
7440-43-9	Cadmium (Cd)	0.03	0.07	0.02	0.14	0.03	0.26	
7440-70-2	Calcium (Ca)	568.	22700.	2030.	33200.	7030.	65500.	
7440-47-3	Chromium (Cr)	6.4	16.8	12.9	21.6	48.8	30.6	
7440-48-4	Cobalt (Co)	0.91	12.1	1.6	3.2	6.7	4.7	
7440-50-8	Copper (Cu)	1.1	17.5	7.7	45.	49.2	43.3	
7439-89-6	Iron (Fe)	2070.	8400.	4440.	17300.	23700.	15700.	
7439-92-1	Lead (Pb)	4.9	26.7	18.2	60.5	82.8	78.2	
7439-95-4	Magnesium (Mg)	296.	1310.	560.	1410.	3210.	2460.	
7439-96-5	Manganese (Mn)	17.	99.7	51.3	189.	302.	239.	
7439-97-6	Mercury (Hg)	0.04	0.05	0.07	0.2	0.27	0.22	
7440-02-0	Nickel (Ni)	1.8	6.8	4.3	8.3	16.9	13.2	
7440-09-7	Potassium (K)	152.	744.	259.	722.	1670.	1530.	
7782-49-2	Selenium (Se)	0.35	0.57	0.45	0.66	1.7	0.73	
7440-22-4	Silver (Ag)	0.04	0.04	0.04	0.04	0.05	0.04	
7440-23-5	Sodium (Na)	132.	219.	118.	236.	318.	297.	
7440-28-0	Thallium (Tl)	0.21	0.19	0.19	0.18	0.25	0.21	
7440-31-5	Tin (Sn)	3.5	6.4	3.3	8.4	6.4	6.2	
7440-62-2	Vanadium (V)	4.4	18.2	9.1	17.4	46.4	31.5	
7440-66-6	Zinc (Zn)	5.2	69.3	44.8	159.	209.	173.	

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CHARLESTON - ZONE F
CHARLESTON ZONE F SOIL
SDG# EN028

SWB46-META

SAMPLE ID ----->	620-C-8013-01	620-S-8013-02	620-C-8013-02	620-S-8014-01	620-S-8014-02	BLK-0-N028-05
ORIGINAL ID ----->	620CB01301	620SB01302	620CB01302	620SB01401	620SB01402	PBS1EN028
LAB SAMPLE ID ---->	9911401-16	9911401-13	9911401-11	9911401-14	9911401-15	PBS1-EN028
ID FROM REPORT -->	620CB01301	620SB01302	620CB01302	620SB01401	620SB01402	PBS1EN028
SAMPLE DATE ----->	11/16/99	11/16/99	11/16/99	11/16/99	11/16/99	11/22/99
DATE EXTRACTED -->	11/29/99	11/29/99	11/29/99	11/29/99	11/29/99	11/22/99
DATE ANALYZED ---->	11/30/99	11/30/99	11/30/99	11/30/99	11/30/99	11/23/99
MATRIX ----->	Soil	Soil	Soil	Soil	Soil	Soil
UNITS ----->	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG

CAS #	Parameter	EN028	EN028	EN028	EN028	EN028	EN028
7429-90-5	Aluminum (Al)	11600.	18200.	17400.	4860.	7150.	-16.75 B
7440-36-0	Antimony (Sb)	1.6	1.9	2.1	0.62	0.66	0.39 B
7440-38-2	Arsenic (As)	12.5	14.2	15.2	18.5	6.3	0.2 U
7440-39-3	Barium (Ba)	30.3	37.5	35.8	27.2	16.5	0.03 U
7440-41-7	Beryllium (Be)	0.73	1.	0.97	0.19	0.31	0.09 U
7440-43-9	Cadmium (Cd)	0.03	0.13	0.11	0.18	0.02	0.05 B
7440-70-2	Calcium (Ca)	35300.	42700.	33200.	82100.	13500.	-6.14 B
7440-47-3	Chromium (Cr)	31.8	42.8	43.4	11.3	13.	0.06 U
7440-48-4	Cobalt (Co)	4.8	6.8	6.2	2.2	2.4	0.05 U
7440-50-8	Copper (Cu)	44.5	52.1	43.7	45.1	14.	-0.08 B
7439-89-6	Iron (Fe)	18500.	24500.	22300.	4280.	8210.	2.12 U
7439-92-1	Lead (Pb)	77.8	88.3	88.9	44.	27.9	0.26 B
7439-95-4	Magnesium (Mg)	2270.	3360.	2900.	2190.	930.	-7.20 B
7439-96-5	Manganese (Mn)	242.	323.	296.	84.1	121.	0.03 U
7439-97-6	Mercury (Hg)	0.26	0.35	0.26	0.04	0.07	0.1 U
7440-02-0	Nickel (Ni)	12.6	18.7	15.5	6.7	5.3	0.11 U
7440-09-7	Potassium (K)	1320.	1930.	1720.	609.	439.	4.02 U
7782-49-2	Selenium (Se)	1.2	1.1	1.4	0.53	0.72	0.17 U
7440-22-4	Silver (Ag)	0.05	0.05	0.05	0.04	0.04	0.05 B
7440-23-5	Sodium (Na)	263.	368.	310.	224.	114.	38.7 U
7440-28-0	Thallium (Tl)	0.23	0.24	0.26	0.19	0.2	-0.93 B
7440-31-5	Tin (Sn)	6.4	10.1	7.1	3.7	4.1	3.52 B
7440-62-2	Vanadium (V)	31.9	43.	45.5	10.7	16.8	0.05 U
7440-66-6	Zinc (Zn)	198.	214.	204.	32.1	49.	0.15 U

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CHARLESTON - ZONE F
CHARLESTON ZONE F SOIL
SDG# EN028

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SWB46-META		SAMPLE ID -----> BLK-0-N028-06	BLK-0-N028-07			
		ORIGINAL ID -----> PBS2EN028	PBW1EN028			
		LAB SAMPLE ID ----> PBS2-EN028	PBW1-EN028			
		ID FROM REPORT --> PBS2EN028	PBW1EN028			
		SAMPLE DATE -----> 11/22/99	11/22/99			
		DATE EXTRACTED --> 11/29/99	11/30/99			
		DATE ANALYZED ----> 11/23/99	11/30/99			
		MATRIX -----> Soil	Water			
		UNITS -----> MG/KG	UG/L			
CAS #	Parameter	EN028	EN028			
7429-90-5	Aluminum (Al)	5.87 U	-73.2 B			
7440-36-0	Antimony (Sb)	0.36 B	2.4 U			
7440-38-2	Arsenic (As)	0.2 U	2. U			
7440-39-3	Barium (Ba)	0.04 B	0.3 U			
7440-41-7	Beryllium (Be)	0.09 U	0.9 U			
7440-43-9	Cadmium (Cd)	0.04 B	0.3 U			
7440-70-2	Calcium (Ca)	3.26 U	32.6 U			
7440-47-3	Chromium (Cr)	0.06 U	0.6 U			
7440-48-4	Cobalt (Co)	0.05 U	0.5 U			
7440-50-8	Copper (Cu)	0.11 B	-0.7 B			
7439-89-6	Iron (Fe)	3.88 B	21.2 U			
7439-92-1	Lead (Pb)	0.26 B	2.7 B			
7439-95-4	Magnesium (Mg)	1.36 U	-34.4 B			
7439-96-5	Manganese (Mn)	0.05 B	0.4 B			
7439-97-6	Mercury (Hg)	7777777777	0.2 U			
7440-02-0	Nickel (Ni)	0.11 U	1.1 U			
7440-09-7	Potassium (K)	4.02 U	40.2 U			
7782-49-2	Selenium (Se)	0.17 U	1.7 U			
7440-22-4	Silver (Ag)	0.05 U	0.5 U			
7440-23-5	Sodium (Na)	38.7 U	387. U			
7440-28-0	Thallium (Tl)	-0.87 B	-3. B			
7440-31-5	Tin (Sn)	3.28 B	2.7 U			
7440-62-2	Vanadium (V)	0.05 U	0.5 U			
7440-66-6	Zinc (Zn)	0.37 B	1.6 B			

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CHARLESTON - ZONE F
CHARLESTON ZONE F SOIL
SDG# EN028

SWB46-SV0A

SAMPLE ID ----->	613-S-B025-01	613-S-B026-01	613-S-B026-02	613-C-B026-02	613-E-B026-02	613-F-B026-02
ORIGINAL ID ----->	613S802501	613S802601	613S802602	613C802602	613E802602	613F802602
LAB SAMPLE ID ---->	9911401-01	9911401-02	9911425-03	9911425-04	9911425-05	9911425-07
ID FROM REPORT -->	613S802501	613S802601	613S802602	613C802602	613E802602	613F802602
SAMPLE DATE ----->	11/16/99	11/16/99	11/17/99	11/17/99	11/17/99	11/17/99
DATE EXTRACTED -->	11/17/99	11/17/99	11/23/99	11/23/99	11/22/99	11/22/99
DATE ANALYZED ---->	11/24/99	11/24/99	11/29/99	11/29/99	11/29/99	11/29/99
MATRIX ----->	Soil	Soil	Soil	Soil	Water	Water
UNITS ----->	UG/KG	UG/KG	UG/KG	UG/KG	UG/L	UG/L

CAS #	Parameter	EN028	EN028	EN028	EN028	EN028	EN028
108-95-2	Phenol	480. U	490. U	530. U	540. U	5. U	5. U
111-44-4	bis(2-Chloroethyl)ether	480. U	490. U	530. U	540. U	5. U	5. U
95-57-8	2-Chlorophenol	480. U	490. U	530. U	540. U	5. U	5. U
541-73-1	1,3-Dichlorobenzene	480. U	490. U	530. U	540. U	5. U	5. U
106-46-7	1,4-Dichlorobenzene	480. U	490. U	530. U	540. U	5. U	5. U
100-51-6	Benzyl alcohol	480. U	490. U	530. U	540. U	5. U	5. U
95-50-1	1,2-Dichlorobenzene	480. U	490. U	530. U	540. U	5. U	5. U
95-48-7	2-Methylphenol (o-Cresol)	480. U	490. U	530. U	540. U	5. U	5. U
108-60-1	2,2'-oxybis(1-Chloropropane)	480. U	490. U	530. U	540. U	5. U	5. U
106-44-5	4-Methylphenol (p-Cresol)	480. U	490. U	530. U	540. U	5. U	5. U
621-64-7	N-Nitroso-di-n-propylamine	480. U	490. U	530. U	540. U	5. U	5. U
67-72-1	Hexachloroethane	480. U	490. U	530. U	540. U	5. U	5. U
98-95-3	Nitrobenzene	480. U	490. U	530. U	540. U	5. U	5. U
78-59-1	Isophorone	480. U	180. J	530. U	540. U	5. U	5. U
88-75-5	2-Nitrophenol	480. U	490. U	530. U	540. U	5. U	5. U
105-67-9	2,4-Dimethylphenol	480. U	490. U	530. U	540. U	5. U	5. U
65-85-0	Benzoic acid	2400. U	2500. U	2600. U	2700. U	25. U	25. U
111-91-1	bis(2-Chloroethoxy)methane	480. U	490. U	530. U	540. U	5. U	5. U
120-83-2	2,4-Dichlorophenol	480. U	490. U	530. U	540. U	5. U	5. U
120-82-1	1,2,4-Trichlorobenzene	480. U	490. U	530. U	540. U	5. U	5. U
91-20-3	Naphthalene	110. J	490. U	530. U	540. U	5. U	5. U
106-47-8	4-Chloroaniline	480. U	490. U	530. U	540. U	5. U	5. U
87-68-3	Hexachlorobutadiene	480. U	490. U	530. U	540. U	5. U	5. U
59-50-7	4-Chloro-3-methylphenol	480. U	490. U	530. U	540. U	5. U	5. U
91-57-6	2-Methylnaphthalene	200. J	490. U	530. U	540. U	5. U	5. U
77-47-4	Hexachlorocyclopentadiene	480. U	490. U	530. U	540. U	5. U	5. U
88-06-2	2,4,6-Trichlorophenol	480. U	490. U	530. U	540. U	5. U	5. U
95-95-4	2,4,5-Trichlorophenol	480. U	490. U	530. U	540. U	5. U	5. U
91-58-7	2-Chloronaphthalene	480. U	490. U	530. U	540. U	5. U	5. U
88-74-4	2-Nitroaniline	480. U	490. U	530. U	540. U	5. U	5. U
131-11-3	Dimethyl phthalate	480. U	490. U	530. U	540. U	5. U	5. U
208-96-8	Acenaphthylene	480. U	490. U	530. U	540. U	5. U	5. U
99-09-2	3-Nitroaniline	480. U	490. U	530. U	540. U	5. U	5. U
83-32-9	Acenaphthene	480. U	490. U	530. U	540. U	5. U	5. U
51-28-5	2,4-Dinitrophenol	950. U	980. U	1100. U	1100. U	10. U	10. U
100-02-7	4-Nitrophenol	950. U	980. U	1100. U	1100. U	10. U	10. U

CHARLESTON - ZONE F
CHARLESTON ZONE F SOIL
SDG# EN028

SL846-SVOA	SAMPLE ID -----> ORIGINAL ID -----> LAB SAMPLE ID ----> ID FROM REPORT --> SAMPLE DATE -----> DATE EXTRACTED --> DATE ANALYZED ----> MATRIX -----> UNITS ----->	613-S-8025-01 613S802501 9911401-01 613S802501 11/16/99 11/17/99 11/24/99 Soil UG/KG	613-S-8026-01 613S802601 9911401-02 613S802601 11/16/99 11/17/99 11/24/99 Soil UG/KG	613-S-8026-02 613S802602 9911425-03 613S802602 11/17/99 11/23/99 11/29/99 Soil UG/KG	613-C-8026-02 613C802602 9911425-04 613C802602 11/17/99 11/23/99 11/29/99 Soil UG/KG	613-E-8026-02 613E802602 9911425-05 613E802602 11/17/99 11/22/99 11/29/99 Water UG/L	613-F-8026-02 613F802602 9911425-07 613F802602 11/17/99 11/22/99 11/29/99 Water UG/L
CAS #	Parameter	EN028	EN028	EN028	EN028	EN028	EN028
132-64-9	Dibenzofuran	480. U	490. U	530. U	540. U	5. U	5. U
121-14-2	2,4-Dinitrotoluene	480. U	490. U	530. U	540. U	5. U	5. U
606-20-2	2,6-Dinitrotoluene	480. U	490. U	530. U	540. U	5. U	5. U
84-66-2	Diethylphthalate	480. U	490. U	530. U	540. U	5. U	5. U
7005-72-3	4-Chlorophenylphenylether	480. U	490. U	530. U	540. U	5. U	5. U
86-73-7	Fluorene	480. U	490. U	530. U	540. U	5. U	5. U
100-01-6	4-Nitroaniline	480. U	490. U	530. U	540. U	5. U	5. U
534-52-1	2-Methyl-4,6-Dinitrophenol	950. U	980. U	1100. U	1100. U	10. U	10. U
86-30-6	N-Nitrosodiphenylamine	480. U	490. U	530. U	540. U	5. U	5. U
101-55-3	4-Bromophenyl-phenylether	480. U	490. U	530. U	540. U	5. U	5. U
118-74-1	Hexachlorobenzene	480. U	490. U	530. U	540. U	5. U	5. U
87-86-5	Pentachlorophenol	950. U	980. U	1100. U	1100. U	10. U	10. U
85-01-8	Phenanthrene	480. U	490. U	200. J	540. U	5. U	5. U
120-12-7	Anthracene	480. U	490. U	530. U	540. U	5. U	5. U
84-74-2	Di-n-butylphthalate	480. U	490. U	530. U	540. U	5. U	5. U
206-44-0	Fluoranthene	480. U	490. U	360. J	540. U	5. U	5. U
129-00-0	Pyrene	480. U	490. U	290. J	540. U	5. U	5. U
85-68-7	Butylbenzylphthalate	480. U	490. U	530. U	540. U	5. U	5. U
91-94-1	3,3'-Dichlorobenzidine	950. U	980. U	1100. U	1100. U	10. U	10. U
56-55-3	Benzo(a)anthracene	480. U	490. U	190. J	540. U	5. U	5. U
117-81-7	bis(2-Ethylhexyl)phthalate (BEHP)	480. U	490. U	530. U	540. U	5. U	5. U
218-01-9	Chrysene	480. U	490. U	190. J	540. U	5. U	5. U
117-84-0	Di-n-octyl phthalate	480. U	490. U	530. U	540. U	5. U	5. U
205-99-2	Benzo(b)fluoranthene	480. U	490. U	130. J	540. U	5. U	5. U
207-08-9	Benzo(k)fluoranthene	480. U	490. U	150. J	540. U	5. U	5. U
50-32-8	Benzo(a)pyrene	480. U	490. U	160. J	540. U	5. U	5. U
193-39-5	Indeno(1,2,3-cd)pyrene	480. U	490. U	530. U	540. U	5. U	5. U
53-70-3	Dibenz(a,h)anthracene	480. U	490. U	530. U	540. U	5. U	5. U
191-24-2	Benzo(g,h,i)perylene	480. U	490. U	530. U	540. U	5. U	5. U

01

013

CHARLESTON - ZONE F
CHARLESTON ZONE F SOIL
SDG# EN028

SWB46-SVOA		SAMPLE ID ----->	613-D-B026-02	613-S-B027-01	613-S-B027-02	613-S-B028-01	613-S-B028-02	BLK-D-N028-01
		ORIGINAL ID ----->	613D802602	613S802701	613S802702	613S802801	613S802802	B111799MSV
		LAB SAMPLE ID ---->	9911425-06	9911401-03	9911401-04	9911401-05	9911401-06	B111799MSV
		ID FROM REPORT -->	613D102602	613S802701	613S802702	613S802801	613S802802	B111799MSV
		SAMPLE DATE ----->	11/17/99	11/16/99	11/16/99	11/16/99	11/16/99	11/17/99
		DATE EXTRACTED -->	11/22/99	11/17/99	11/17/99	11/19/99	11/17/99	11/17/99
		DATE ANALYZED ---->	11/29/99	11/24/99	11/24/99	11/24/99	11/24/99	11/23/99
		MATRIX ----->	Water	Soil	Soil	Soil	Soil	Soil
		UNITS ----->	UG/L	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
CAS #	Parameter	EN028	EN028	EN028	EN028	EN028	EN028	EN028
108-95-2	Phenol	5. U	510. U	360. U	530. U	370. U	330. U	
111-44-4	bis(2-Chloroethyl)ether	5. U	510. U	360. U	530. U	370. U	330. U	
95-57-8	2-Chlorophenol	5. U	510. U	360. U	530. U	370. U	330. U	
541-73-1	1,3-Dichlorobenzene	5. U	510. U	360. U	530. U	370. U	330. U	
106-46-7	1,4-Dichlorobenzene	5. U	510. U	360. U	530. U	370. U	330. U	
100-51-6	Benzyl alcohol	5. U	510. U	360. U	530. U	370. U	330. U	
95-50-1	1,2-Dichlorobenzene	5. U	510. U	360. U	530. U	370. U	330. U	
95-48-7	2-Methylphenol (o-Cresol)	5. U	510. U	360. U	530. U	370. U	330. U	
108-60-1	2,2'-oxybis(1-Chloropropane)	5. U	510. U	360. U	530. U	370. U	330. U	
106-44-5	4-Methylphenol (p-Cresol)	5. U	510. U	360. U	530. U	370. U	330. U	
621-64-7	N-Nitroso-di-n-propylamine	5. U	510. U	360. U	530. U	370. U	330. U	
67-72-1	Hexachloroethane	5. U	510. U	360. U	530. U	370. U	330. U	
98-95-3	Nitrobenzene	5. U	510. U	360. U	530. U	370. U	330. U	
78-59-1	Isophorane	5. U	510. U	360. U	530. U	370. U	330. U	
88-75-5	2-Nitrophenol	5. U	510. U	360. U	530. U	370. U	330. U	
105-67-9	2,4-Dimethylphenol	5. U	510. U	360. U	530. U	370. U	330. U	
65-85-0	Benzoic acid	26. U	110. U	1800. U	2600. U	1900. U	1700. U	
111-91-1	bis(2-Chloroethoxy)methane	5. U	510. U	360. U	530. U	370. U	330. U	
120-83-2	2,4-Dichlorophenol	5. U	510. U	360. U	530. U	370. U	330. U	
120-82-1	1,2,4-Trichlorobenzene	5. U	510. U	360. U	530. U	370. U	330. U	
91-20-3	Naphthalene	5. U	510. U	360. U	530. U	370. U	330. U	
106-47-8	4-Chloroaniline	5. U	510. U	360. U	530. U	370. U	330. U	
87-68-3	Hexachlorobutadiene	5. U	510. U	360. U	530. U	370. U	330. U	
59-50-7	4-Chloro-3-methylphenol	5. U	510. U	360. U	530. U	370. U	330. U	
91-57-6	2-Methylnaphthalene	5. U	510. U	360. U	530. U	370. U	330. U	
77-47-4	Hexachlorocyclopentadiene	5. U	510. U	360. U	530. U	370. U	330. U	
88-06-2	2,4,6-Trichlorophenol	5. U	510. U	360. U	530. U	370. U	330. U	
95-95-4	2,4,5-Trichlorophenol	5. U	510. U	360. U	530. U	370. U	330. U	
91-58-7	2-Chloronaphthalene	5. U	510. U	360. U	530. U	370. U	330. U	
88-74-4	2-Nitroaniline	5. U	510. U	360. U	530. U	370. U	330. U	
131-11-3	Dimethyl phthalate	5. U	510. U	360. U	530. U	370. U	330. U	
208-96-8	Acenaphthylene	5. U	510. U	360. U	530. U	370. U	330. U	
99-09-2	3-Nitroaniline	5. U	510. U	360. U	530. U	370. U	330. U	
83-32-9	Acenaphthene	5. U	510. U	360. U	530. U	370. U	330. U	
51-28-5	2,4-Dinitrophenol	11. U	1000. U	720. U	1100. U	740. U	670. U	
100-02-7	4-Nitrophenol	11. U	1000. U	720. U	1100. U	740. U	670. U	

CHARLESTON - ZONE F
CHARLESTON ZONE F SOIL
SDG# EN028

EN028-5V00

SAMPLE ID ----->	613-D-8026-02	613-S-8027-01	613-S-8027-02	613-S-8028-01	613-S-8028-02	BLK-D-8028-01
ORIGINAL ID ----->	613D802602	613S802701	613S802702	613S802801	613S802802	B111799MSV
LAB SAMPLE ID ---->	9911425-06	9911401-03	9911401-04	9911401-05	9911401-06	B111799MSV
ID FROM REPORT -->	613D102602	613S802701	613S802702	613S802801	613S802802	B111799MSV
SAMPLE DATE ----->	11/17/99	11/16/99	11/16/99	11/16/99	11/16/99	11/17/99
DATE EXTRACTED -->	11/22/99	11/17/99	11/17/99	11/19/99	11/17/99	11/17/99
DATE ANALYZED ---->	11/29/99	11/24/99	11/24/99	11/24/99	11/24/99	11/23/99
MATRIX ----->	Water	Soil	Soil	Soil	Soil	Soil
UNITS ----->	UG/L	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG

CAS #	Parameter	EN028	EN028	EN028	EN028	EN028	EN028
132-64-9	Dibenzofuran	5. U	510. U	360. U	530. U	370. U	330. U
121-14-2	2,4-Dinitrotoluene	5. U	510. U	360. U	530. U	370. U	330. U
606-20-2	2,6-Dinitrotoluene	5. U	510. U	360. U	530. U	370. U	330. U
84-66-2	Diethylphthalate	5. U	510. U	360. U	530. U	370. U	330. U
7005-72-3	4-Chlorophenylphenylether	5. U	510. U	360. U	530. U	370. U	330. U
86-73-7	Fluorene	5. U	510. U	360. U	530. U	370. U	330. U
100-01-6	4-Nitroaniline	5. U	510. U	360. U	530. U	370. U	330. U
534-52-1	2-Methyl-4,6-Dinitrophenol	11. U	1000. U	720. U	1100. U	740. U	670. U
86-30-6	N-Nitrosodiphenylamine	5. U	510. U	360. U	530. U	370. U	330. U
101-55-3	4-Bromophenyl-phenylether	5. U	510. U	360. U	530. U	370. U	330. U
118-74-1	Hexachlorobenzene	5. U	510. U	360. U	530. U	370. U	330. U
87-86-5	Pentachlorophenol	11. U	1000. U	720. U	1100. U	740. U	670. U
85-01-8	Phenanthrene	5. U	510. U	360. U	530. U	370. U	330. U
120-12-7	Anthracene	5. U	510. U	360. U	530. U	370. U	330. U
84-74-2	Di-n-butylphthalate	5. U	1500. U	360. U	530. U	370. U	330. U
206-44-0	Fluoranthene	5. U	510. U	360. U	530. U	370. U	330. U
129-00-0	Pyrene	5. U	510. U	360. U	530. U	370. U	330. U
85-68-7	Butylbenzylphthalate	5. U	510. U	360. U	530. U	370. U	330. U
91-94-1	3,3'-Dichlorobenzidine	11. U	1000. U	720. U	1100. U	740. U	670. U
56-55-3	Benzo(a)anthracene	5. U	510. U	360. U	530. U	370. U	330. U
117-81-7	bis(2-Ethylhexyl)phthalate (BEHP)	5. U	510. U	360. U	530. U	370. U	330. U
218-01-9	Chrysene	5. U	510. U	360. U	530. U	370. U	85. J
117-84-0	Di-n-octyl phthalate	5. U	510. U	360. U	530. U	370. U	330. U
205-99-2	Benzo(b)fluoranthene	5. U	510. U	360. U	530. U	370. U	330. U
207-08-9	Benzo(k)fluoranthene	5. U	510. U	360. U	530. U	370. U	330. U
50-32-8	Benzo(a)pyrene	5. U	510. U	360. U	530. U	370. U	330. U
193-39-5	Indeno(1,2,3-cd)pyrene	5. U	510. U	360. U	530. U	370. U	330. U
53-70-3	Dibenz(a,h)anthracene	5. U	510. U	360. U	530. U	370. U	330. U
191-24-2	Benzo(g,h,i)perylene	5. U	510. U	360. U	530. U	370. U	330. U

CHARLESTON - ZONE F
CHARLESTON ZONE F SOIL
SDG# EN028

W846-SVOA

SAMPLE ID ----->	BLK-0-N028-02	BLK-0-N028-03	BLK-0-N028-04
ORIGINAL ID ----->	B111999MSV	B112299MSV	B112399MSV
LAB SAMPLE ID ---->	B111999MSV	B112299MSV	B112399MSV
ID FROM REPORT -->	B111999MSV	B112299MSV	B112399MSV
SAMPLE DATE ----->	11/19/99	11/22/99	11/23/99
DATE EXTRACTED -->	11/19/99	11/22/99	11/23/99
DATE ANALYZED ---->	11/24/99	11/29/99	11/29/99
MATRIX ----->	Soil	Water	Soil
UNITS ----->	UG/KG	UG/L	UG/KG

CAS #	Parameter	EN028	EN028	EN028			
108-95-2	Phenol	330. U	5. U	330. U			
111-44-4	bis(2-Chloroethyl)ether	330. U	5. U	330. U			
95-57-8	2-Chlorophenol	330. U	5. U	330. U			
541-73-1	1,3-Dichlorobenzene	330. U	5. U	330. U			
106-46-7	1,4-Dichlorobenzene	330. U	5. U	330. U			
100-51-6	Benzyl alcohol	330. U	5. U	330. U			
95-50-1	1,2-Dichlorobenzene	330. U	5. U	330. U			
95-48-7	2-Methylphenol (o-Cresol)	330. U	5. U	330. U			
108-60-1	2,2'-oxybis(1-Chloropropane)	330. U	5. U	330. U			
106-44-5	4-Methylphenol (p-Cresol)	330. U	5. U	330. U			
621-64-7	N-Nitroso-di-n-propylamine	330. U	5. U	330. U			
67-72-1	Hexachloroethane	330. U	5. U	330. U			
98-95-3	Nitrobenzene	330. U	5. U	330. U			
78-59-1	Isophorone	330. U	5. U	330. U			
88-75-5	2-Nitrophenol	330. U	5. U	330. U			
105-67-9	2,4-Dimethylphenol	330. U	5. U	330. U			
65-85-0	Benzoic acid	1700. U	25. U	1700. U			
111-91-1	bis(2-Chloroethoxy)methane	330. U	5. U	330. U			
120-83-2	2,4-Dichlorophenol	330. U	5. U	330. U			
120-82-1	1,2,4-Trichlorobenzene	330. U	5. U	330. U			
91-20-3	Naphthalene	330. U	5. U	330. U			
106-47-8	4-Chloroaniline	330. U	5. U	330. U			
87-68-3	Hexachlorobutadiene	330. U	5. U	330. U			
59-50-7	4-Chloro-3-methylphenol	330. U	5. U	330. U			
91-57-6	2-Methylnaphthalene	330. U	5. U	330. U			
77-47-4	Hexachlorocyclopentadiene	330. U	5. U	330. U			
88-06-2	2,4,6-Trichlorophenol	330. U	5. U	330. U			
95-95-4	2,4,5-Trichlorophenol	330. U	5. U	330. U			
91-58-7	2-Chloronaphthalene	330. U	5. U	330. U			
88-74-4	2-Nitroaniline	330. U	5. U	330. U			
131-11-3	Dimethyl phthalate	330. U	5. U	330. U			
208-96-8	Acenaphthylene	330. U	5. U	330. U			
99-09-2	3-Nitroaniline	330. U	5. U	330. U			
83-32-9	Acenaphthene	330. U	5. U	330. U			
51-28-5	2,4-Dinitrophenol	670. U	10. U	670. U			
100-02-7	4-Nitrophenol	670. U	10. U	670. U			

1/10/99

CHARLESTON - ZONE F
CHARLESTON ZONE F SOIL
SDG# EN028

SAMPLE ID ----->		BLK-0-N028-02	BLK-0-N028-03	BLK-0-N028-04			
ORIGINAL ID ----->		B111999MSV	B112299MSV	B112399MSV			
LAB SAMPLE ID ---->		B111999MSV	B112299MSV	B112399MSV			
ID FROM REPORT -->		B111999MSV	B112299MSV	B112399MSV			
SAMPLE DATE ----->		11/19/99	11/22/99	11/23/99			
DATE EXTRACTED -->		11/19/99	11/22/99	11/23/99			
DATE ANALYZED ---->		11/24/99	11/29/99	11/29/99			
MATRIX ----->		Soil	Water	Soil			
UNITS ----->		UG/KG	UG/L	UG/KG			
CAS #	Parameter	EN028	EN028	EN028			
132-64-9	Dibenzofuran	330. U	5. U	330. U			
121-14-2	2,4-Dinitrotoluene	330. U	5. U	330. U			
606-20-2	2,6-Dinitrotoluene	330. U	5. U	330. U			
84-66-2	Diethylphthalate	330. U	5. U	330. U			
7005-72-3	4-Chlorophenylphenylether	330. U	5. U	330. U			
86-73-7	Fluorene	330. U	5. U	330. U			
100-01-6	4-Nitroaniline	330. U	5. U	330. U			
534-52-1	2-Methyl-4,6-Dinitrophenol	670. U	10. U	670. U			
86-30-6	N-Nitrosodiphenylamine	330. U	5. U	330. U			
101-55-3	4-Bromophenyl-phenylether	330. U	5. U	330. U			
118-74-1	Hexachlorobenzene	330. U	5. U	330. U			
87-86-5	Pentachlorophenol	670. U	10. U	670. U			
85-01-8	Phenanthrene	330. U	5. U	330. U			
120-12-7	Anthracene	330. U	5. U	330. U			
84-74-2	Di-n-butylphthalate	330. U	5. U	330. U			
206-44-0	Fluoranthene	330. U	5. U	330. U			
129-00-0	Pyrene	330. U	5. U	330. U			
85-68-7	Butylbenzylphthalate	330. U	5. U	330. U			
91-94-1	3,3'-Dichlorobenzidine	670. U	10. U	670. U			
56-55-3	Benzo(a)anthracene	330. U	5. U	330. U			
117-81-7	bis(2-Ethylhexyl)phthalate (BEHP)	330. U	5. U	330. U			
218-01-9	Chrysene	330. U	5. U	330. U			
117-84-0	Di-n-octyl phthalate	330. U	5. U	330. U			
205-99-2	Benzo(b)fluoranthene	330. U	5. U	330. U			
207-08-9	Benzo(k)fluoranthene	330. U	5. U	330. U			
50-32-8	Benzo(a)pyrene	330. U	5. U	330. U			
193-39-5	Indeno(1,2,3-cd)pyrene	330. U	5. U	330. U			
53-70-3	Dibenz(a,h)anthracene	330. U	5. U	330. U			
191-24-2	Benzo(g,h,i)perylene	330. U	5. U	330. U			

Data Validation Summary - Charleston Naval Complex - Zone F, AOC 620

TO: Louise Palmer/CH2M HILL/CLT

FROM: Amy Juchem/CH2M HILL/GNA
Herb Kelly/CH2M HILL/GNA

DATE: February 16, 2002

The purpose of this memorandum is to present the results of the data validation process for the samples collected in Zone F, AOC 620. The samples were collected between the dates of June 5, 2001 and January 8, 2003.

The specific samples and analytical fractions reviewed are summarized below in [REDACTED].

The Quality Control areas that were reviewed and the resulting findings are documented within each subsection that follows. This data was validated for compliance with the analytical method requirements. This process also included a review of the data to assess the accuracy, precision, and completeness based upon procedures described in the guidance documents such as the Environmental Protection Agency (EPA) *National Functional Guidelines for Inorganic Data Review* (EPA 2002) and *National Functional Guidelines for Organic Data Review* (EPA 1999). Quality assurance/quality control (QA/QC) summary forms and data reports were reviewed.

Samples were submitted to General Engineering Laboratories, Inc., in Charleston, South Carolina, for the following analyses: SW-846 8260 Volatile Organic Compounds (VOC), SW-846 8270 Semivolatile Organic Compounds (SVOC), SW-846 8082 Polychlorinated Biphenyls, Metals following SW-846 6010/7000 Series methodology, SW-846 9045 pH, SW-846 1311 Toxicity Characteristic Leaching Procedure (TCLP) followed by analysis of Metals (SW-846 6010/7000), and SW-846 1312 Synthetic Precipitation Leaching Procedure (SPLP) followed by analysis of Metals (SW-846 6010/7000).

Samples were submitted to Severn Trent Services, STL Savannah Laboratories, Inc., in Savannah, Georgia, for the following analyses: Metals following SW-846 6010/7000 Series methodology and SW-846 1311 Toxicity Characteristic Leaching Procedure (TCLP) followed by analysis of Metals (SW-846 6010/7000).

Sample results that were not within the acceptance limits were appended with a qualifying flag, which consisted of a single- or double-letter code that indicated a possible problem with the data. The qualifying flags originated during the data review and validation processes. These also include the secondary, or the two-digit "sub-qualifier" flags. The secondary qualifiers provide the reasoning behind the assignment of a qualifier flag to the data. The secondary qualifiers are presented and defined below.

[REDACTED] lists the changes in data qualifiers, due to the validation process.

The following primary flags were used to qualify the data:

- [=] Detected. The analyte was analyzed for and detected at the concentration shown.
- [J] Estimated. The analyte was present but the reported value may not be accurate or precise.
- [U] Undetected. The analyte was analyzed for but not detected above the method detection limit.
- [UJ] Detection limit estimated. The analyte was analyzed for but qualified as not detected; the result is estimated.
- [R] Rejected. The data is not useable.

Secondary Data Validation Qualifiers

<u>Code</u>	<u>Definition</u>
2S	Second Source
2C	Second Column Confirmation
BL	Blank
BD	Blank Spike/Blank Spike Duplicate or (LCS/LCSD) Precision
BS	Blank Spike/LCS
CC	Continuing Calibration Verification
DL	Dilution
FD	Field Duplicate
HT	Holding Time
IB	In-Between (metals – B's → J's)
IC	Initial Calibration
IS	Internal Standard
LD	Lab Duplicate
LR	Concentration exceeded Linear Range
MD	MS/MSD or LCS/LCSD Precision
MS	Matrix Spike/Matrix Spike Duplicate
OT	Other (see DV worksheet)
PD	Pesticide Degradation
PS	Post Spike
RE	Re-extraction/Re-analysis
SD	Serial Dilution
SS	Spiked Surrogate
TD	Total vs. Dissolved
TN	Tune

Table 1 - Chemical Analytical Methods – Field and Quality Control Samples – Organic Analyses**TABLE 1**

Chemical Analytical Methods – Field and Quality Control Samples – Organic Analyses
 Charleston Naval Complex, Zone F, AOC 620, Charleston, SC

43522	F620SB017	620SB01701	43522001	SO	N		0	1	06/06/01			X
43522	F620SB018	620SB01801	43522002	SO	N		0	1	06/06/01			X
43522	F620SB019	620SB01901	43522003	SO	N		0	1	06/06/01			X
43522	F620SB020	620SB02001	43522004	SO	N		0	1	06/06/01			X
43522	F620SB021	620SB02101	43522005	SO	N		0	1	06/06/01			X
43522	LABQC	1200017080	1200017080	SQ	LB							X
43522	LABQC	1200017085	1200017085	SQ	BS							X
43561	F620SB015	620SB01501	43561001	SO	N		0	1	06/06/01			X
43561	F620SB016	620SB01601	43561002	SO	N		0	1	06/06/01			X
43561	F620SB017	620SB01701	43561003	SO	N		0	1	06/06/01	X	X	
43561	F620SB017	620SB01703	43561004	SO	N				06/06/01	X	X	
43561	F620SB018	620SB01801	43561005	SO	N		0	1	06/06/01	X	X	
43561	F620SB018	620SB01803	43561006	SO	N				06/06/01	X	X	
43561	F620SB018	620CB01801	43561007	SO	FD		0	1	06/06/01	X	X	X
43561	LABQC	1200017593	1200017593	SQ	LB							X
43561	LABQC	1200017596	1200017596	SQ	BS							X
43561	LABQC	1200017597	1200017597	SQ	BD							X

TABLE 1

Chemical Analytical Methods – Field and Quality Control Samples – Organic Analyses
 Charleston Naval Complex, Zone F, AOC 620, Charleston, SC

Sample ID	Method	Sample Name	Sample ID	Method	Sample Name	Sample ID	Method	Sample Name	Sample ID	Method	Sample Name	Sample ID	Method	Sample Name
43561	LABQC	1200019240	1200019240	SQ	LB							X		
43561	F620SB017	620SB01701MS	1200019241	SO	MS		0	1	06/06/01			X		
43561	F620SB017	620SB01701SD	1200019243	SO	SD		0	1	06/06/01			X		
43561	LABQC	1200019245	1200019245	SQ	BS							X		
43561	LABQC	1200022461	1200022461	SQ	LB						X			
43561	F620SB017	620SB01701MS	1200022462	SO	MS		0	1	06/06/01		X			
43561	F620SB017	620SB01701SD	1200022463	SO	SD		0	1	06/06/01		X			
43561	LABQC	1200022464	1200022464	SQ	BS						X			
43561	LABQC	1200023337	1200023337	SQ	LB						X			
43561	LABQC	1200023338	1200023338	SQ	BS						X			
43562	FIELDQC	620EB02101	43562001	WQ	EB				06/06/01		X	X	X	
43562	FIELDQC	620TB02101	43562002	WQ	TB				06/05/01		X			
43562	LABQC	1200017667	1200017667	WQ	LB								X	
43562	LABQC	1200017672	1200017672	WQ	BS								X	
43562	LABQC	1200018606	1200018606	WQ	LB							X		
43562	LABQC	1200018609	1200018609	WQ	BS							X		
43562	LABQC	1200020388	1200020388	WQ	LB						X			
43562	LABQC	1200020389	1200020389	WQ	BS						X			
43562	LABQC	1200020902	1200020902	WQ	LB						X			
43562	LABQC	1200020903	1200020903	WQ	BS						X			

TABLE 1

Chemical Analytical Methods – Field and Quality Control Samples – Organic Analyses
 Charleston Naval Complex, Zone F, AOC 620, Charleston, SC

Sample ID	Method	Sample Name	Sample ID	Method	Result	Result	Result	Result	Result	Result	Result
44280	F620SB019	620SB01903	44280001	SO	N				06/06/01		X
44280	F620SB019	620SB01903RE	44280001	SO	LR	RE			06/06/01		X
44280	F620SB020	620SB02003	44280002	SO	N				06/06/01		X
44280	F620SB020	620SB02003RE	44280002	SO	LR	RE			06/06/01		X
44280	F620SB021	620SB02103	44280003	SO	N				06/06/01		X
44280	F620SB021	620SB02103RE	44280003	SO	LR	RE			06/06/01		X
44280	LABQC	1200023037	1200023037	SQ	LB						X
44280	LABQC	1200023040	1200023040	SQ	BS						X
44280	LABQC	1200023041	1200023041	SQ	BD						X
44280	LABQC	1200036646	1200036646	SQ	LB						X
44280	LABQC	1200036647	1200036647	SQ	BS						X
55143 (55141W)	ZMSLZDRM1	MSLZDRM1M1	55143001	WG	N				01/24/02	X	X
55143 (55141W)	ZMSLZDRM1	MSLZDRM1M1LR	55143001	WG	LR	DL			01/24/02	X	
55143 (55141W)	ZMSLZDRM2	MSLZDRM2M1	55143002	WG	N				01/24/02	X	X
55143 (55141W)	ZMSLZDRM3	MSLZDRM3M1	55143003	WG	N				01/24/02	X	X
55143 (55141W)	H666GW001	MSLZDRM3M1LR	55143003	WG	LR	DL			01/24/02	X	
55143 (55141W)	H196ZDRM1	196ZDRM1M1	55143006	WG	N				01/24/02	X	
55143 (55141W)	LABQC	1200139798	1200139798	WQ	LB						X
55143 (55141W)	LABQC	1200139799	1200139799	WQ	BS						X
55143 (55141W)	LABQC	1200140749	1200140749	WQ	LB					X	

TABLE 1

Chemical Analytical Methods – Field and Quality Control Samples – Organic Analyses
 Charleston Naval Complex, Zone F, AOC 620, Charleston, SC

55143 (55141W)	LABQC	1200140750	1200140750	WQ	BS					X		
55143 (55141W)	LABQC	1200141719	1200141719	WQ	LB					X		
55143 (55141W)	LABQC	1200141720	1200141720	WQ	BS					X		
MATRIX CODE WG – Groundwater WQ – Water QC Sample SO – Soil SQ – Soil QC Sample SAMPLE TYPE CODE BS - Blank Spike BD – Blank Spike Duplicate EB - Equipment Blank TB – Trip Blank N - Native Sample FD – Field Duplicate LB - Laboratory Blank LR – Laboratory Replicate MS – Matrix Spike SD – Matrix Spike Duplicate LR TYPE CODE RE – Reanalysis DL – Dilution ANALYSIS CODE VOC - Volatile Organic Compounds SVOC - Semivolatile Organic Compounds PCBs – Polychlorinated Biphenyls												

Table 2 - Chemical Analytical Methods – Field and Quality Control Samples – Inorganic Analyses

TABLE 2
Chemical Analytical Methods – Field and Quality Control Samples – Inorganic Analyses
Charleston Naval Complex, Zone F, AOC 620, Charleston, SC

	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Type	Depth	Depth	Collected	Metals SW6010	Metals SW6010	Metals SW6010	SW7470 SW7470	Mercury SW7470	Mercury SW7470	Mercury SW9005
561	F620SB017	620SB01701	43561003	SO	N		0	1	06/06/01	X			X			
561	F620SB017	620SB01703	43561004	SO	N				06/06/01	X			X			
561	F620SB018	620SB01801	43561005	SO	N		0	1	06/06/01	X			X			
561	F620SB018	620SB01803	43561006	SO	N				06/06/01	X			X			
561	F620SB018	620CB01801	43561007	SO	FD		0	1	06/06/01	X			X			
561	LABQC	1200019979	1200019979	SQ	LB					X						
561	F620SB017	620SB01701MS	1200019984	SO	MS		0	1	06/06/01	X						
561	F620SB017	620SB01701SD	1200019985	SO	SD		0	1	06/06/01	X						
561	LABQC	1200019986	1200019986	SQ	BS					X						
561	LABQC	1200020670	1200020670	SQ	LB								X			
561	LABQC	1200020677	1200020677	SQ	BS								X			
561	LABQC	1200023361	1200023361	SQ	LB					X						
561	LABQC	1200023362	1200023362	SQ	BS					X						
562	FIELDQC	620EB02101	43562001	WQ	EB				06/06/01	X			X			
562	LABQC	1200018314	1200018314	WQ	LB					X						
562	LABQC	1200018318	1200018318	WQ	BS					X						
562	LABQC	1200020046	1200020046	WQ	LB								X			

E 2

Chemical Analytical Methods – Field and Quality Control Samples – Inorganic Analyses
 Weston Naval Complex, Zone F, AOC 620, Charleston, SC

	Sample ID	Sample Name	Sample Number	Sample Type	Sample Matrix	Sample Date	Sample Time	Sample Location	Sample Status	Sample Result	Sample Unit	Sample Method	Sample Detection Limit	Sample Reporting Limit	Sample Comment
2	FIELDQC	620EB02101MS	1200020049	WQ	MS			06/06/01					X		
2	FIELDQC	620EB02101SD	1200020051	WG	SD			06/06/01					X		
2	LABQC	1200020053	1200020053	WQ	BS								X		
3	F620SB034	620SB03403	50283001	SO	N	2	3	10/10/01	X		X		X	X	
3	F620SB034	620SB03401	50283002	SO	N	0	1	10/10/01	X				X	X	
3	F620SB022	620SB02201	50283003	SO	N	0	1	10/10/01	X				X		
3	F620SB022	620SB02203	50283004	SO	N	2	3	10/10/01	X				X		
3	F620SB023	620SB02301	50283005	SO	N	0	1	10/10/01	X				X		
3	F620SB023	620CB02301	50283006	SO	FD	0	1	10/10/01	X				X		
3	F620SB029	620SB02901	50283007	SO	N	0	1	10/10/01	X				X		
3	F620SB030	620SB03001	50283008	SO	N	0	1	10/10/01	X				X	X	
3	F620SB031	620SB03101	50283009	SO	N	0	1	10/10/01	X						
3	F620SB032	620SB03201	50283010	SO	N	0	1	10/10/01	X		X				
3	F620SB032	620SB03203	50283011	SO	N	2	3	10/10/01	X						
3	F620SB032	620CB03203	50283012	SO	FD	2	3	10/10/01	X						
3	F620SB033	620SB03301	50283013	SO	N	0	1	10/10/01	X						
3	F620SB033	620SB03303	50283014	SO	N	2	3	10/10/01	X		X				
3	F620SB035	620SB03501	50283015	SO	N	0	1	10/10/01	X		X				
3	F620SB035	620SB03503	50283016	SO	N	2	3	10/10/01	X						

BLE 2

Chemical Analytical Methods – Field and Quality Control Samples – Inorganic Analyses
 Charleston Naval Complex, Zone F, AOC 620, Charleston, SC

	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID
	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID
283	F620SB036	620SB03601	50283017	SO	N		0	1	10/10/01	X						
283	F620SB036	620SB03603	50283018	SO	N		2	3	10/10/01	X		X				
283	F620SB037	620SB03701	50283019	SO	N		0	1	10/10/01	X						
283	F620SB037	620SB03703	50283020	SO	N		2	3	10/10/01	X		X				
283	LABQC	1200094205	1200094205	SQ	LB					X						
283	LABQC	1200094206	1200094206	SQ	BS					X						
283	F620SB034	620SB03403MS	1200094207	SO	MS		2	3	10/10/01	X						
283	F620SB034	620SB03403SD	1200094208	SO	SD		2	3	10/10/01	X						
283	LABQC	1200094210	1200094210	SQ	LB							X				
283	F620SB034	620SB03403MS	1200094211	SO	MS		2	3	10/10/01			X				
283	F620SB034	620SB03403SD	1200094212	SO	SD		2	3	10/10/01			X				
283	LABQC	1200094213	1200094213	SQ	BS							X				
283	LABQC	1200097977	1200097977	SQ	LB							X		X		
283	LABQC	1200098545	1200098545	SQ	LB					X						
283	LABQC	1200098546	1200098546	SQ	BS					X						
283	F620SB034	620SB03403LR	1200098547	SO	LR				10/10/01			X				
283	F620SB034	620SB03403MS	1200098548	SO	MS		2	3	10/10/01			X				
283	LABQC	1200098639	1200098639	SQ	LB							X				
283	F620SB034	620SB03403MS	1200098641	SO	MS		2	3	10/10/01					X		

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ical Analytical Methods – Field and Quality Control Samples – Inorganic Analyses
 eston Naval Complex, Zone F, AOC 620, Charleston, SC

Sample ID	Sample Name	Sample Number	Sample Date	Sample Type	Sample Status	Sample Location	Sample Depth	Sample Volume	Sample Date	Sample Date	Sample Date	Sample Date	Sample Date	Sample Date	Sample Date	Sample Date
3	F620SB034	620SB03403SD	1200098642	SO	SD		2	3	10/10/01					X		
3	LABQC	1200098643	1200098643	SQ	BS								X			
6 (50283B)	F620SB026	620SB02601	50286001	SO	N		0	1	10/10/01	X						
6 (50283B)	F620SB023	620SB02303	50286002	SO	N		2	3	10/10/01	X						
6 (50283B)	F620SB024	620SB02401	50286003	SO	N		0	1	10/10/01	X						
6 (50283B)	F620SB024	620SB02403	50286004	SO	N		2	3	10/10/01	X						
6 (50283B)	F620SB025	620SB02501	50286005	SO	N		0	1	10/10/01	X						
6 (50283B)	F620SB026	620SB02603	50286006	SO	N		2	3	10/10/01	X						
6 (50283B)	F620SB027	620SB02701	50286007	SO	N		0	1	10/10/01	X						
6 (50283B)	F620SB027	620SB02703	50286008	SO	N		2	3	10/10/01	X						
6 (50283B)	F620SB028	620SB02801	50286009	SO	N		0	1	10/10/01	X						
6 (50283B)	F620SB028	620SB02803	50286010	SO	N		2	3	10/10/01	X						
6 (50283B)	F620SB038	620SB03801	50286011	SO	N		0	1	10/10/01	X						
6 (50283B)	F620SB038	620SB03803	50286012	SO	N		2	3	10/10/01	X		X				
6 (50283B)	F620SB039	620SB03901	50286013	SO	N		0	1	10/10/01	X						
6 (50283B)	F620SB039	620CB03901	50286014	SO	FD		0	1	10/10/01	X						
6 (50283B)	F620SB039	620SB03903	50286015	SO	N		2	3	10/10/01	X						
6 (50283B)	F620SB040	620SB04001	50286016	SO	N		0	1	10/10/01	X						
6 (50283B)	F620SB040	620SB04003	50286017	SO	N		2	3	10/10/01	X						

TABLE 2

Chemical Analytical Methods – Field and Quality Control Samples – Inorganic Analyses
 Charleston Naval Complex, Zone F, AOC 620, Charleston, SC

	Sample ID	Sample ID	Sample ID	Matrix	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth
286 (50283B)	F620SB041	620SB04101	50286018	SO	N		0	1	10/10/01	X							
286 (50283B)	F620SB041	620SB04103	50286019	SO	N		2	3	10/10/01	X							
286 (50283B)	F620SB042	620SB04201	50286020	SO	N		0	1	10/10/01	X							
286 (50283B)	LABQC	1200094850	1200094850	SQ	LB					X							
286 (50283B)	LABQC	1200094851	1200094851	SQ	BS					X							
286 (50283B)	F620SB026	620SB02601MS	1200094852	SO	MS		0	1	10/10/01	X							
286 (50283B)	F620SB026	620SB02601SD	1200094853	SO	SD		0	1	10/10/01	X							
286 (50283B)	LABQC	1200098545	1200098545	SQ	LB					X							
286 (50283B)	LABQC	1200098546	1200098546	SQ	BS					X							
288 (50283C)	F620SB042	620SB04203	50288001	SO	N		2	3	10/10/01	X							
288 (50283C)	F620SB043	620SB04301	50288002	SO	N		0	1	10/10/01	X			X				
288 (50283C)	F620SB043	620SB04303	50288003	SO	N		2	3	10/10/01	X							
288 (50283C)	F620SB044	620SB04401	50288004	SO	N		0	1	10/10/01	X							
288 (50283C)	F620SB044	620SB04403	50288005	SO	N		2	3	10/10/01	X							
288 (50283C)	F620SB045	620SB04501	50288006	SO	N		0	1	10/10/01	X							
288 (50283C)	F620SB045	620SB04503	50288007	SO	N		2	3	10/10/01	X							
288 (50283C)	F620SB046	620SB04601	50288008	SO	N		0	1	10/10/01	X							
288 (50283C)	F620SB046	620SB04603	50288009	SO	N		2	3	10/10/01	X							
288 (50283C)	F620SB046	620CB04603	50288010	SO	FD		2	3	10/10/01	X							

FILE 2

Chemical Analytical Methods – Field and Quality Control Samples – Inorganic Analyses
 Charleston Naval Complex, Zone F, AOC 620, Charleston, SC

Sample ID	Sample Type	Sample Number	Sample Name	Sample Type	Sample Type	Sample Type	Sample Type	Sample Type	Sample Type	Sample Type	Sample Type	Sample Type	Sample Type	Sample Type	Sample Type	Sample Type
88 (50283C)	LABQC	1200094855	1200094855	SQ	LB					X						
88 (50283C)	LABQC	1200094856	1200094856	SQ	BS					X						
88 (50283C)	F620SB042	620SB04203MS	1200094857	SO	MS		2	3	10/10/01	X						
88 (50283C)	F620SB042	620SB04203SD	1200094858	SO	SD		2	3	10/10/01	X						
90 (50283D)	FIELDQC	620EB022L1	50290001	SQ	EB				10/10/01	X			X			
90 (50283D)	F620GW002	620GW002L1	50290002	WG	N				10/11/01	X			X			
90 (50283D)	FIELDQC	620EW002L1	50290003	WQ	EB				10/11/01	X			X			
90 (50283D)	F620GW004	620GW004L1	50290004	WG	N				10/11/01	X						
90 (50283D)	LABQC	1200094222	1200094222	WQ	LB								X			
90 (50283D)	FIELDQC	620EB022L1MS	1200094224	SQ	MS				10/10/01				X			
90 (50283D)	FIELDQC	620EB022L1SD	1200094225	SQ	SD				10/10/01				X			
90 (50283D)	LABQC	1200094227	1200094227	WQ	BS								X			
90 (50283D)	LABQC	1200094834	1200094834	WQ	LB					X						
90 (50283D)	LABQC	1200094835	1200094835	WQ	BS					X						
90 (50283D)	F620GW004	620GW004L1MS	1200094836	WG	MS				10/11/01	X						
90 (50283D)	F620GW004	620GW004L1SD	1200094837	WG	SD				10/11/01	X						
81	F620SB053	620SB05301	52481001	SO	N		0	1	11/26/01	X			X			
81	F620SB053	620SB05302	52481002	SO	N		3	5	11/26/01	X			X			
81	F620SB053	620CB05302	52481003	SO	FD		3	5	11/26/01	X			X			

Chemical Analytical Methods – Field and Quality Control Samples – Inorganic Analyses
Charleston Naval Complex, Zone F, AOC 620, Charleston, SC

ZF_AOC_620_DV_SUMMARY_030214.DOC

TABLE 2

Chemical Analytical Methods – Field and Quality Control Samples – Inorganic Analyses
 Charleston Naval Complex, Zone F, AOC 620, Charleston, SC

Sample ID	Sample Name	Sample ID	Sample Name	Matrix	Method	Depth	Depth	Date	SW600-0	SW600-1	SW600-2	SW600-3	SW600-4	SW600-5	SW600-6	SW600-7
81	F620SB053	620SB05301MS	1200114408	SO	MS		0	1	11/26/01	X						
81	F620SB053	620SB05301SD	1200114410	SO	SD		0	1	11/26/01	X						
81	LABQC	1200114411	1200114411	SQ	BS					X						
83 (52481B)	F620SB053	620SB05301	52483001	SO	N		0	1	11/26/01			X				
83 (52481B)	F620SB053	620SB05302	52483002	SO	N		3	5	11/26/01			X				
83 (52481B)	F620SB053	620CB05302	52483003	SO	FD		3	5	11/26/01		X					
83 (52481B)	F620SB055	620SB05501	52483004	SO	N		0	1	11/26/01			X				
83 (52481B)	F620SB055	620SB05502	52483005	SO	N		3	5	11/26/01			X				
83 (52481B)	F620SB056	620SB05601	52483006	SO	N		0	1	11/26/01			X				
83 (52481B)	F620SB056	620SB05602	52483007	SO	N		3	5	11/26/01			X				
83 (52481B)	F620SB054	620SB05401	52483008	SO	N		0	1	11/26/01		X					
83 (52481B)	F620SB054	620SB05402	52483009	SO	N		3	5	11/26/01		X					
83 (52481B)	F620SB057	620SB05701	52483010	SO	N		0	1	11/26/01		X					
83 (52481B)	F620SB057	620SB05702	52483011	SO	N		3	5	11/26/01		X					
83 (52481B)	F620SB058	620SB05802	52483012	SO	N		3	5	11/26/01		X					
83 (52481B)	F620SB059	620SB05901	52483013	SO	N		0	1	11/26/01		X					
83 (52481B)	LABQC	1200114108	1200114108	SQ	LB						X					
83 (52481B)	LABQC	1200114116	1200114116	SQ	LB						X					
83 (52481B)	LABQC	1200114941	1200114941	SQ	LB					X						

TABLE 2

Chemical Analytical Methods – Field and Quality Control Samples – Inorganic Analyses
 Charleston Naval Complex, Zone F, AOC 620, Charleston, SC

Site	Sample ID	Sample Name	Sample ID	Matrix	Sample Type	Depth	Depth	Collected	Metal SW6010	Metal SW6010	Metal SW6010	Metal SW6010	Metal SW6010	Metal SW6010	Metal SW6010	pH SW9045
2483 (52481B)	F620SB053	620SB05301MS	1200114943	SO	MS	0	1	11/26/01				X				
2483 (52481B)	F620SB053	620SB05301SD	1200114944	SO	SD	0	1	11/26/01				X				
2483 (52481B)	LABQC	1200114945	1200114945	SQ	BS				X							
2483 (52481B)	LABQC	1200115688	1200115688	SQ	LB				X							
2483 (52481B)	F620SB054	620SB05401MS	1200115693	SO	MS	0	1	11/26/01		X						
2483 (52481B)	F620SB054	620SB05401SD	1200115694	SO	SD	0	1	11/26/01		X						
2483 (52481B)	LABQC	1200115695	1200115695	SQ	BS				X							
2542 (52481C)	FIELDQC	620EB053L1	52542001	WQ	EB			11/26/01	X				X			
2542 (52481C)	LABQC	1200114399	1200114399	WQ	LB				X							
2542 (52481C)	LABQC	1200114400	1200114400	WQ	BS				X							
2542 (52481C)	LABQC	1200115013	1200115013	WQ	LB								X			
2542 (52481C)	FIELDQC	620EB053L1MS	1200115014	WQ	MS			11/26/01					X			
2542 (52481C)	FIELDQC	620EB053L1SD	1200115016	WQ	SD			11/26/01					X			
2542 (52481C)	LABQC	1200115018	1200115018	WQ	BS								X			
2542 (52481C)	FIELDQC	620EB053L1MS	1200115589	WQ	MS			11/26/01	X							
2542 (52481C)	FIELDQC	620EB053L1SD	1200115590	WQ	SD			11/26/01	X							
143 (55141W)	ZMSLZDRM1	MSLZDRM1M1	55143001	WG	N			01/24/02	X				X			
143 (55141W)	ZMSLZDRM1	MSLZDRM1M1LR	55143001	WG	LR	DL		01/24/02								
143 (55141W)	ZMSLZDRM2	MSLZDRM2M1	55143002	WG	N			01/24/02	X				X			

FILE 2

Chemical Analytical Methods – Field and Quality Control Samples – Inorganic Analyses
 Charleston Naval Complex, Zone F, AOC 620, Charleston, SC

43 (55141W)	ZMSLZDRM3	MSLZDRM3M1	55143003	WG	N				01/24/02	X			X			
43 (55141W)	H666GW001	MSLZDRM3M1LR	55143003	WG	LR	DL			01/24/02							
43 (55141W)	F620ZDRM1	620ZDRM1M1	55143004	WG	N				01/24/02	X			X			
43 (55141W)	H642ZDRM1	642ZDRM1M1	55143005	WG	N				01/24/02	X						
43 (55141W)	LABQC	1200140177	1200140177	WQ	LB					X						
43 (55141W)	LABQC	MSLZDRM1M1MS	1200140179	WG	MS				01/24/02	X						
43 (55141W)	ZMSLZDRM1	MSLZDRM1M1SD	1200140180	WG	SD				01/24/02	X						
43 (55141W)	LABQC	1200140181	1200140181	WQ	BS					X						
43 (55141W)	LABQC	1200140235	1200140235	WQ	LB								X			
43 (55141W)	LABQC	MSLZDRM1M1MS	1200140237	WG	MS				01/24/02				X			
43 (55141W)	ZMSLZDRM1	MSLZDRM1M1SD	1200140239	WG	SD				01/24/02				X			
43 (55141W)	LABQC	1200140240	1200140240	WQ	BS								X			
85	F620SB067	620SB06701	55785001	SO	N		0	1	02/07/02	X						
85	F620SB062	620SB06201	55785002	SO	N		0	1	02/07/02	X						X
85	F620SB062	620SB06202	55785003	SO	N		3	5	02/07/02	X						X
85	F620SB063	620SB06301	55785004	SO	N		0	1	02/07/02	X						X
85	F620SB063	620SB06302	55785005	SO	N		3	5	02/07/02	X						X
85	F620SB061	620SB06101	55785006	SO	N		0	1	02/07/02	X						
85	F620SB061	620SB06102	55785007	SO	N		3	5	02/07/02	X						

Chemical Analytical Methods – Field and Quality Control Samples – Inorganic Analyses
Charleston Naval Complex, Zone F, AOC 620, Charleston, SC

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TABLE 2

Chemical Analytical Methods – Field and Quality Control Samples – Inorganic Analyses
 Charleston Naval Complex, Zone F, AOC 620, Charleston, SC

Sample ID	Sample Name	Sample Number	Sample ID	Sample Name	Sample Number	Sample ID	Sample Name	Sample Number	Sample ID	Sample Name	Sample Number	Sample ID	Sample Name	Sample Number	Sample ID	Sample Name	Sample Number
84	F620SB072	620SB07201	71384001	SO	N		0	1	12/02/02	X							
84	LABQC	1200344942	1200344942	SQ	LB					X							
84	LABQC	1200344943	1200344943	SQ	BS					X							
84	F620SB072	620SB07201MS	1200344944	SO	MS		0	1	12/02/02	X							
84	F620SB072	620SB07201SD	1200344945	SO	SD		0	1	12/02/02	X							
42	FIELDQC	620EB068M4	71442001	WQ	EB				12/02/02	X							
42	LABQC	1200344936	1200344936	WQ	LB					X							
42	LABQC	1200344937	1200344937	WQ	BS					X							
61	F620SB073	620SB07301	73061001	SO	N		0	1	01/08/03	X							
61	F620SB073	620SB07303	73061002	SO	N		1	2	01/08/03	X							
61	F620SB074	620SB07401	73061003	SO	N		0	1	01/08/03	X							
61	F620SB074	620SB07403	73061004	SO	N		1	2	01/08/03	X							
61	F620SB074	620CB07403	73061005	SO	FD		1	2	01/08/03	X							
61	F620SB075	620SB07501	73061006	SO	N		0	1	01/08/03	X							
61	F620SB075	620SB07503	73061007	SO	N		1	2	01/08/03	X							
61	F620SB076	620SB07601	73061008	SO	N		0	1	01/08/03	X							
61	F620SB076	620SB07603	73061009	SO	N		1	2	01/08/03	X							
61	LABQC	1200362040	1200362040	SQ	LB					X							
61	LABQC	1200362041	1200362041	SQ	BS					X							

TABLE 2

Chemical Analytical Methods – Field and Quality Control Samples – Inorganic Analyses
 Charleston Naval Complex, Zone F, AOC 620, Charleston, SC

SDG	Sample ID	Standard ID	Lab Sample ID	Matrix	Sample Type	Type	Depth	Depth	Collected	Method SW6010	Method Metals SW6010	Method Metals SW6010	Method SW7470A	Method Mercury SW7470A	Method Mercury SW7470A	Method SW9045
3061	F620SB073	620SB07301MS	1200362042	SO	MS		0	1	01/08/03	X						
3061	F620SB073	620SB07301SD	1200362043	SO	SD		0	1	01/08/03	X						
3062	FIELDQC	620EB073N1	73062001	WQ	EB				01/08/03	X						
3062	LABQC	1200362047	1200362047	WQ	LB					X						
3062	LABQC	1200362048	1200362048	WQ	BS					X						
NC74	F620VA001	620VA001M1	S241646*1	SO	N				03/07/02		X				X	
NC74	F620VA002	620VA002M1	S241646*2	SO	N				03/07/02		X				X	
NC74	F620VA003	620VA003M1	S241646*3	SO	N				03/07/02		X				X	
NC74	F620VA004	620VA004M1	S241646*4	SO	N				03/07/02		X				X	
NC74	LABQC	416465LB	S241646*5	SQ	LB						X				X	
NC74	LABQC	416466BS	S241646*6	SQ	BS						X				X	
NC150	F620SB068	620SB06801	S248528*1	SO	N		0	1	11/22/02	X						
NC150	F620SB069	620SB06901	S248528*2	SO	N		0	1	11/22/02	X						
NC150	F620SB070	620SB07001	S248528*3	SO	N		0	1	11/22/02	X						
NC150	F620SB071	620SB07101	S248528*4	SO	N		0	1	11/22/02	X						
NC150	F620SB071	620CB07101	S248528*5	SO	FD		0	1	11/22/02	X						
NC150	FIELDQC	620EB068M3	S248528*6	WQ	EB				11/22/02	X						
NC150	LABQC	485287LB	S248528*7	SQ	LB					X						
NC150	LABQC	485288BS	S248528*8	SQ	BS					X						

TABLE 2

Chemical Analytical Methods – Field and Quality Control Samples – Inorganic Analyses
 Charleston Naval Complex, Zone F, AOC 620, Charleston, SC

ID	Sample ID	Sample ID	ID	Matrix	Type	Depth	Depth	Depth	Depth	SW600	Metal	Metal	SW600	Mercury	Mercury	SW600
C150	LABQC	4852814LB	S248528*14	WQ	LB					X						
C150	LABQC	4852815BS	S248528*15	WQ	BS					X						

MATRIX CODE

- Groundwater
- Water QC Sample
- Soil
- Soil QC Sample

SAMPLE TYPE CODE

- Blank Spike
- Equipment Blank
- Native Sample
- Field Duplicate
- Laboratory Blank
- Laboratory Replicate
- Matrix Spike
- Matrix Spike Duplicate

TYPE CODE

- Laboratory Duplicate
- Dilution

ANALYSIS CODE

- P – Toxicity Characteristic Leaching Procedure
- P – Synthetic Precipitation Leaching Procedure

Organic Parameters

Quality Control Review

The following list represents the QA/QC measures that were reviewed during the data quality evaluation procedure for organic data.

- **Holding Times** – The holding times are evaluated to verify that samples were extracted and analyzed within holding times.
- **Blank samples** – Method blanks, equipment blanks, and trip blanks were provided for this project. Blank samples enable the reviewer to determine if an analyte may be attributed to sampling or laboratory procedures, rather than environmental contamination from site activities.
- **Surrogate Recoveries** – Surrogate Compounds are added to each sample and the recoveries are used to monitor lab performance and possible matrix interference.
- **Lab Control Sample (LCS)** – This sample is a "controlled matrix", either laboratory reagent water or Ottawa sand, in which target compounds have been added prior to extraction/analysis. The recoveries serve as a monitor of the overall performance of each step during the analysis, including sample preparation.
- **Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples** – Spike recovery is used to evaluate potential matrix interferences, as well as accuracy. Precision information is also determined by calculating the reproducibility between the recoveries of each spiked parameter.
- **Field Duplicate Samples** – These samples are collected to determine precision between a native and its duplicate. This information can only be determined when target compounds are detected.
- **GC/MS Tuning** – The mass spectrum of the tuning compound is evaluated for method compliance. The criteria are established to verify the proper mass assignment and mass resolution.
- **Initial Calibration** – The initial calibration ensures that the instrument is capable of producing acceptable qualitative and quantitative data for the compounds of interest.
- **Continuing Calibration** – The continuing calibration checks satisfactory performance of the instrument and its predicted response to the target compounds.
- **Pesticide Degradation** – Degradation checks on the gas chromatograph with electron capture detector system are performed to ensure minimal instrument breakdown of target compounds. These criteria are not sample specific.
- **Confirmation** – If GCMS methodology is not initially used for analysis, SW-846 method 8000 requires confirmation when the composition of samples is not well characterized. Therefore, even when the identification has been confirmed on a dissimilar column or detector, the agreement of the quantitative results on both columns is evaluated. For Pesticide and PCB analyses covered in this report, confirmation was performed using a

dissimilar analytical column. The laboratory analyzed samples with a gas chromatograph (GC) utilizing simultaneous primary and confirmation data acquisition. Per SW-86 method 8000, 40% RPD criteria was used as the acceptance limit.

- **Internal Standards** – The internal standards (retention time and response) are evaluated for method compliance. The internal standards are used in quantitation of the target parameters and monitor the instrument sensitivity and response for stability during each analysis.

Volatile Organic Compounds (VOC) Analyses

The QA/QC parameters for VOC analyses for all of the samples were within acceptable control limits, except as noted below:

Blanks

The VOC target parameters detected in blank samples are listed in **Table 3**.

TABLE 3

Blank Contamination: VOC

Charleston Naval Complex, Zone F, AOC 620, Charleston, SC

43561	1200022461	1200022461	LB	Methylene chloride	2.1	µg/Kg	21.0 µg/Kg
43561	1200023337	1200023337	LB	Methylene chloride	1.6	µg/Kg	16.0 µg/Kg
43561	620TB02101	43562002	TB	Methylene chloride	1.6	µg/L	16.0 µg/L
43561	620TB02101	43562002	TB	Toluene	0.34	µg/L	1.7 µg/L
43562	620TB02101	43562002	TB	Methylene chloride	1.6	µg/L	16.0 µg/L
43562	620TB02101	43562002	TB	Toluene	0.34	µg/L	1.7 µg/L
43562	1200020902	1200020902	LB	Methylene chloride	1.4	µg/L	14.0 µg/L
43562	1200020902	1200020902	LB	Toluene	0.23	µg/L	1.2 µg/L
55143	1200140749	1200140749	LB	1,4-Dichlorobenzene	0.19	µg/L	1.0 µg/L

If a target parameter determined to be a common contaminant was reported in a field sample, and the concentration was below the level determined to be due to blank contamination, the following actions were taken:

- If the concentration was above the reporting limit, the numeric result was unchanged, but it was flagged "U", as undetected.

- If the concentration was below the reporting limit, the numeric result was changed to the value of the reporting limit, and it was flagged "U", as undetected.

The results qualified due to blank contamination are listed in [REDACTED].

Recoveries - Surrogate, MS/MSD and LCS

All Surrogate, Matrix Spike (MS), Matrix Spike Duplicate (MSD), and Laboratory Control Sample (LCS) recoveries and Relative Percent Deviations (RPDs) were within acceptable quality control limits, except as noted in [REDACTED] below.

TABLE 4

Surrogate, MS/MSD, and LCS Recoveries and RPDs Out of QC Limits: VOC
Charleston Naval Complex, Zone F, AOC 620, Charleston, SC

43561	620SB01701 MS/MSD	Bromomethane	170.4* / 172.6*	70-130	620SB01701	Detects only -J
		Vinyl acetate	147.6* / 137.6*			
		4-Methyl-2-pentanone	133.2* / 132.8*			
		Dibromochloromethane	130.2* / 136.8*			
		Bromoform	167.8* / 174.6*			
		1,1,2,2-Tetrachloroethane	154.4* / 156.6*			
		Acetone	48.4* / 46.8*	70-130	620SB01701	Detects-J, non-detects-UJ
		2-Chloroethyl vinyl ether	0* / 0*			
43561	1200022464 LCS	Vinyl acetate	198.4*	70-130	43561003- 43561007	Detects only -J
		2-Chloroethyl vinyl ether	64.8*	70-130	43561003- 43561007	Detects-J, non-detects-UJ
55143	1200140750 LCS	2-Chloroethyl vinyl ether	134.8*	70-130	55143006, 55143001DL, 55143003DL	Detects only -J
* - out of control limits						

Initial and Continuing Calibration Criteria

All initial calibration criteria and continuing calibration criteria were met, except as listed in **Table 5**.

TABLE 5

Exceptions to Initial Calibration Criteria and Continuing Calibration Criteria: VOC
Charleston Naval Complex, Zone F, AOC 620, Charleston, SC

VOA8-ICAL-04/28/01, 1115	Acetone	$R^2 = 0.987$	43561 - All
	2-Butanone	$R^2 = 0.989$	
VOA8-CCAL-06/19/01, 0812	Methylene chloride	22.8% high	43561003 through 43561007
	Bromochloromethane	40.4% high	
	Dibromomethane	24.1% high	
	Dibromochloromethane	30.8% high	
	Bromoform	31.7% high	
VOA1-CCAL-06/14/01, 0831	Vinyl acetate	43.4% low	43562001
	2-Chloroethyl vinyl ether	25.3% low	
VOA1-CCAL-06/15/01, 0829	Xylenes (total)	21.8% low	43562002
	Chloromethane	38.1% low	
	Vinyl acetate	51.7% low	
	Carbon tetrachloride	20.9% low	
VOA8-CCAL-01/28/02, 1914	Vinyl acetate	38.1% low	55143001, 55143002, 55143003
	2-Chloroethyl vinyl ether	39.9% high	
VOA8-CCAL-01/30/02, 0704	2-Chloroethyl vinyl ether	49.6% high	55143006, 55143001DL, 55143003DL

Flags were applied to the compounds in the associated samples in the following manner:

- When the percent Relative Standard Deviation (%RSD) or correlation coefficient (R^2) was out in the initial calibration, all associated samples were qualified. Detected compounds were flagged "J" and non-detected compounds were flagged "UJ", as estimated.
- When the percent difference (%D) was low in the continuing calibration standards, detected compounds were flagged "J" and non-detected compounds were flagged "UJ", as estimated.

- When the percent difference (%D) was high in the continuing calibration standards, detected compounds were flagged "J", as estimated. Non-detected compounds were not flagged.

Internal Standard Area

All internal standard areas were within QC limits, except as noted in **Table 6** below.

TABLE 6

Internal Standard Area out of Criteria: VOC

Charleston Naval Complex, Zone F, AOC 620, Charleston, SC

43561	43561003	1,4-Dichlorobenzene – 53.4% low	Detects-J, non-detects-UJ
43561	43561004	1,4-Dichlorobenzene – 51.5% low	Detects-J, non-detects-UJ
43561	43561005	1,4-Dichlorobenzene – 61.1% low	Detects-J, non-detects-UJ
43561	43561006	1,4-Dichlorobenzene – 54.1% low	Detects-J, non-detects-UJ
43561	43561007	1,4-Dichlorobenzene – 62.5% low	Detects-J, non-detects-UJ

Semivolatile Organic Compounds (SVOC) Analyses

The QA/QC parameters for the SVOC analyses for all of the samples were within acceptable control limits, except as noted below.

Blanks

The SVOC target parameters detected in blank samples are listed in **Table 7**.

TABLE 7

Blank Contamination: SVOCs

Charleston Naval Complex, Zone F, AOC 620, Charleston, SC

43561	1200019240	1200019240	LB	bis(2-Ethylhexyl)phthalate	11.2	µg/Kg	112.0 µg/Kg
43561	620EB02101	43562001	EB	bis(2-Ethylhexyl)phthalate	0.14	µg/L	462.0 µg/Kg
43562	620EB02101	43562001	EB	bis(2-Ethylhexyl)phthalate	0.14	µg/L	1.4 µg/L
55143	1200139798	1200139798	LB	bis(2-Ethylhexyl)phthalate	4.2	µg/L	42.0 µg/L

If a target parameter determined to be a common contaminant was reported in a field sample, and the concentration was below the level determined to be due to blank contamination, the following actions were taken:

- If the concentration was above the reporting limit, the numeric result was unchanged, but it was flagged "U", as undetected.
- If the concentration was below the reporting limit, the numeric result was changed to the value of the reporting limit, and it was flagged "U", as undetected.

The results qualified due to blank contamination are listed in **Table 8**.

Recoveries - Surrogate, MS/MSD and LCS

All Surrogate, Matrix Spike (MS), Matrix Spike Duplicate (MSD), and Laboratory Control Sample (LCS) recoveries and Relative Percent Deviations (RPDs) were within acceptable quality control limits, except as noted in **Table 8** below.

TABLE 8

Surrogate, MS/MSD and LCS Recoveries and RPDs Out of QC Limits: SVOC
Charleston Naval Complex, Zone F, AOC 620, Charleston, SC

55143	MSLZDRM3M1 (55143003)	2-Fluorophenol (surrogate)	0*	21-110	MSLZDRM3M1 (55143003)	Detects-J, non-detects-R (SVOC acid compounds only)
		Phenol-d5 (surrogate)	0*	10-110		
		2,4,6-Tribromophenol (surrogate)	0*	10-123		
55143	1200139799 LCS	4-Chloroaniline	0*	10-110	55143 - All	Detects-J, non-detects-R
		o-Nitroaniline	0*			
		m-Nitroaniline	0*			
		p-Nitroaniline	0*			
		3,3'-Dichlorobenzidine	0*			
		Carbazole	0*			

* - out of control limits

- Note – Sample 55143003 was re-extracted and re-analyzed due to low surrogate recoveries with similar results.

Field Duplicate Samples

All Field Duplicate Samples were within acceptable quality control limits, except as noted below. No flags are applied due to Field Duplicate precision.

- Benzo(b)fluoranthene and benzo(k)fluoranthene did not meet RPD criteria for the field duplicate pair 620SB01801 / 620CB01801 in SDG 43561 having 96.8% and 100% RPD, respectively. The native sample was analyzed at a 1:4 dilution and the duplicate was analyzed at full concentration. An internal standard associated with these two compounds in the duplicate sample had low recovery, which indicates a possible low bias to the sample results. The soil sample matrix also contributes to the difficulty of performing duplicate studies due to the non-homogeneous nature of the sample. No flags are applied due to field duplicate RPDs.

Initial and Continuing Calibration Criteria

All initial calibration criteria and continuing calibration criteria were met, except as listed in

TABLE 9

Exceptions to Initial Calibration Criteria and Continuing Calibration Criteria: SVOC
Charleston Naval Complex, Zone F, AOC 620, Charleston, SC

MSD7-ICAL-06/12/01, 1207	Benzoic acid	$R^2 = 0.986$	43561 – All 43562 – All
	2-Methyl-4,6-dinitrophenol	$R^2 = 0.986$	
	Pentachlorophenol	$R^2 = 0.989$	
	Benzo(b)fluoranthene	$R^2 = 0.986$	
MSD7-CCAL-06/16/01, 1341	Benzoic acid	20.4% low	43561004 through 43561007
	Hexachlorocyclopentadiene	20.2% high	
	Benzo(k)fluoranthene	22.5% high	
	Benzo(g,h,i)perylene	20.8% high	
MSD7-CCAL-06/18/01, 1513	p-Nitroaniline	22.0% low	43561003
MSD7-CCAL-06/14/01, 1553	Hexachlorocyclopentadiene	31.9% high	43562 – All (field blanks only)
	4-Nitrophenol	20.2% high	
	2-Methyl-4,6-dinitrophenol	26.8% high	
	Benzo(k)fluoranthene	22.8% high	
	3,3'-Dichlorobenzidine	28.7% high	

TABLE 9

Exceptions to Initial Calibration Criteria and Continuing Calibration Criteria: SVOC
 Charleston Naval Complex, Zone F, AOC 620, Charleston, SC

MSD8-ICAL-01/30/02	3,3'-Dichlorobenzidine	$R^2=0.986$	55143001, 55143003
MSD5-ICAL-01/28/02, 1911	Naphthalene	$R^2=0.985$	55143002
	2,4-Dinitrophenol	$R^2=0.987$	
MSD5-CCAL-02/04/02, 0946	2,4-Dinitrophenol	33.9% high	55143002
	3,3'-Dichlorobenzidine	28.1% high	

Flags were applied to the compounds in the associated samples in the following manner:

- When the percent Relative Standard Deviation (%RSD) or correlation coefficient (R^2) was out in the initial calibration, all associated samples were qualified. Detected compounds were flagged "J" and non-detected compounds were flagged "UJ", as estimated.
- When the percent difference (%D) was high in the continuing calibration standards, detected compounds were flagged "J", as estimated. Non-detected compounds were not flagged.
- When the percent difference (%D) was low in the continuing calibration standards, detected compounds were flagged "J" and non-detected compounds were flagged "UJ", as estimated.

Internal Standard Area

All internal standard areas were within QC limits except as noted in **Table 10** below.

TABLE 10

Internal Standard Area out of Criteria: SVOC
 Charleston Naval Complex, Zone F, AOC 620, Charleston, SC

43561	43561007	Perylene-d12 – 62.2% low	Detects-J, non-detects-UJ
55143	55143001	Chrysene-s12 – 57% low Perylene-d12 – 69% low	Detects-J, non-detects-UJ
55143	55143003	Perylene-d12 – 68% low	Detects-J, non-detects-UJ

Polychlorinated Biphenyls (PCBs) Analyses

The QA/QC parameters for the Polychlorinated Biphenyls analyses for all of the samples were within acceptable control limits, except as noted below:

Holding Times

All holding times were met except for the re-extracted samples in SDG 44280 (620SB01903RE, 620SB02003RE, and 620SB02103RE). The samples were re-extracted due to low LCS recoveries and blank contamination associated with the original extracts. The re-extractions were performed 4 days outside of the 14 day holding time. The results from the original analysis were determined to be the better data set. No flags were applied for holding time since the re-extracted results were rejected in favor of the original analysis.

Recoveries - Surrogate, MS/MSD and LCS/LCSD

All Surrogate, Matrix Spike (MS), Matrix Spike Duplicate (MSD), Laboratory Control Sample (LCS), and Laboratory Control Sample Duplicates (LCSD) recoveries and Relative Percent Deviations (RPDs) were within acceptable quality control limits, except as noted in **Table 11** below.

TABLE 11
Surrogate, MS/MSD, and LCS/LCSD Recoveries and RPDs Out of QC Limits: PCBs
Charleston Naval Complex, Zone F, AOC 620, Charleston, SC

44280	1200023040 LCS / 1200023041 LCSD	Aroclor-1260	32* / 89	53-116	94*	40	44280 - All	Detects-J, non- detects-UJ
44280	620SB02003	Tetrachloro-m- xylene	50* / 53*	60-150			620SB02003	Detects-J, non- detects-UJ
		Decachlorobiphenyl	53* / 55*					
44280	620SB02103	Tetrachloro-m- xylene	40* / 44*	60-150			620SB02103	Detects-J, non- detects-UJ
		Decachlorobiphenyl	55* / 50*					
44280	620SB02003RE	Tetrachloro-m- xylene	50* / 42*	60-150			620SB02003 RE	Detects-J, non- detects-UJ
44280	620SB02103RE	Tetrachloro-m- xylene	35* / 32*	60-150			620SB02103 RE	Detects-J, non- detects-UJ
		Decachlorobiphenyl	40* / 40*					

* - out of control limits

Second Column Confirmation

The second column confirmation percent difference (%D) for some detected parameters, exceeded the 40 %D criteria. Those results were flagged "J", as estimated. The laboratory reported the lower of the two concentrations. The individual samples and specific compounds that were flagged are listed in [REDACTED] below.

TABLE 12

Second Column Confirmation out of Criteria: PCBs

Charleston Naval Complex, Zone F, AOC 620 Charleston, SC

[REDACTED]			
44280	620SB02003	44280002	Aroclor-1254
44280	620SB02003RE	44280002RE	Aroclor-1254
44280	620SB02103RE	44280003RE	Aroclor-1254

Inorganic Parameters

Quality Control Review

The following list represents the QA/QC measures that are typically reviewed during the data quality evaluation procedure for inorganic parameters.

- **Holding Times** -- The holding times are evaluated to verify that samples were extracted and analyzed within holding times.
- **Blank samples** -- Sample preparation, initial calibration blanks/continuing calibration blanks, and equipment blanks were provided for this project. Blank samples enable the reviewer to determine if an analyte may be attributed to sampling or laboratory procedures, rather than environmental contamination from site activities.
- **Lab Control Sample (LCS)** -- This sample is a "controlled matrix", in which target parameters have been added prior to digestion/analysis. The recoveries serve as a monitor of the overall performance of each step during the analysis, including sample preparation.
- **Field Duplicate Samples** -- These samples are collected to determine precision between a native and its duplicate. This information can only be determined when target compounds are detected.
- **Pre/Post Digestion Spike (MS/MSD)** -- Spike recovery is used to evaluate potential matrix interferences, as well as accuracy. Precision information is also determined by calculating the reproducibility between the recoveries of each spiked parameter.
- **ICP Interference Check Sample** -- This sample verifies the lab's interelement and background correction factors.
- **Initial Calibration Verification** -- This parameter ensures that the instrument is capable of producing acceptable quantitative data for the target analyte list to be measured.
- **Continuing Calibration Verification** -- This one-point, mid-range parameter establishes that the initial calibration is still valid by checking the performance of the instrument on a continual basis.
- **ICP Serial Dilution** -- The serial dilution of samples quantitated by ICP determines whether or not significant physical or chemical interferences exist due to the sample matrix.

Metals Analyses

The QA/QC parameters for the Metals analyses for all of the samples were within acceptable control limits, except as noted below.

Blanks

The metals target parameters detected in blank samples are listed in [Table 13](#).

TABLE 13

Blank Contamination: Metals

Charleston Naval Complex, Zone F, AOC 620, Charleston, SC

Sample ID	Location	Parameter	Unit	Value	Unit	Value
43561	CCB	CCB Aluminum	µg/L	45.2	mg/Kg	11.3
43561	CCB	CCB Antimony	µg/L	3.57	mg/Kg	0.893
43561	CCB	CCB Arsenic	µg/L	4.08	mg/Kg	1.02
43561	CCB	CCB Beryllium	µg/L	0.290	mg/Kg	0.073
43561	CCB	CCB Cadmium	µg/L	0.503	mg/Kg	0.126
43561	CCB	CCB Chromium	µg/L	0.751	mg/Kg	0.188
43561	CCB	CCB Iron	µg/L	15.0	mg/Kg	3.75
43561	CCB	CCB Lead	µg/L	2.57	mg/Kg	0.6425
43561	CCB	CCB Magnesium	µg/L	7.61	mg/Kg	1.903
43561	CCB	CCB Mercury	µg/L	0.0579	mg/Kg	0.014
43561	CCB	CCB Potassium	µg/L	229	mg/Kg	57.25
43561	CCB	CCB Silver	µg/L	3.64	mg/Kg	0.91
43561	CCB	CCB Sodium	µg/L	434	mg/Kg	108.5
43561	CCB	CCB Zinc	µg/L	4.52	mg/Kg	1.13
43561	1200023361	1200023361 LB Aluminum	mg/Kg	3.40	mg/Kg	17.0
43561	1200023361	1200023361 LB Calcium	mg/Kg	3.53	mg/Kg	17.65
43561	1200023361	1200023361 LB Iron	mg/Kg	1.94	mg/Kg	9.7
43561	1200023361	1200023361 LB Lead	mg/Kg	0.373	mg/Kg	1.865
43561	1200023361	1200023361 LB Magnesium	mg/Kg	0.691	mg/Kg	3.455
43561	1200023361	1200023361 LB Manganese	mg/Kg	0.093	mg/Kg	0.465
43561	1200023361	1200023361 LB Sodium	mg/Kg	3.24	mg/Kg	16.2

TABLE 13

Blank Contamination: Metals

Charleston Naval Complex, Zone F, AOC 620, Charleston, SC

43561	1200023361	1200023361	LB	Zinc	0.21	mg/Kg	1.05 mg/Kg
43561	620EB02101	43562001	EB	Barium	0.472	µg/L	0.118 mg/Kg
43561	620EB02101	43562001	EB	Calcium	164	µg/L	41.0 mg/Kg
43561	620EB02101	43562001	EB	Copper	0.884	µg/L	0.221 mg/Kg
43561	620EB02101	43562001	EB	Iron	36.5	µg/L	9.125 mg/Kg
43561	620EB02101	43562001	EB	Magnesium	35.0	µg/L	8.75 mg/Kg
43561	620EB02101	43562001	EB	Manganese	4.040	µg/L	1.01 mg/Kg
43561	620EB02101	43562001	EB	Nickel	4.480	µg/L	1.12 mg/Kg
43561	620EB02101	43562001	EB	Sodium	67.2	µg/L	16.8 mg/Kg
43561	620EB02101	43562001	EB	Zinc	1.480	µg/L	0.37 mg/Kg
50283	620EB022L1	50290001	EB	Lead	2.750	µg/L	0.6875 mg/Kg
50286	620EB022L1	50290001	EB	Lead	2.750	µg/L	0.6875 mg/Kg
50288	620EB022L1	50290001	EB	Lead	2.750	µg/L	0.6875 mg/Kg
50290	620EB022L1	50290001	EB	Lead	2.750	µg/L	0.6875 mg/Kg
52481	CCB		CCB	Lead	4.10	µg/L	1.025 mg/Kg
52481	1200114404	1200114404	LB	Lead	0.478	mg/Kg	2.39 mg/Kg
52483	CCB		CCB	Lead	5.12	µg/L	25.6 µg/L
55143	CCB		CCB	Barium	0.788	µg/L	3.94 µg/L
55143	CCB		CCB	Cadmium	0.886	µg/L	4.43 µg/L
55143	CCB		CCB	Chromium	1.09	µg/L	5.45 µg/L
55143	CCB		CCB	Silver	2.03	µg/L	10.15 µg/L
55143	1200140177	1200140177	LB	Barium	0.250	µg/L	1.25 µg/L
55143	1200140177	1200140177	LB	Silver	1.04	µg/L	5.2 µg/L
71384	CCB		CCB	Lead	1.61	µg/L	0.805 mg/Kg
71384	12000344942	12000344942	LB	Lead	0.245	mg/Kg	1.225 mg/Kg
71442	CCB		CCB	Lead	1.96	µg/L	9.8 µg/L
CNC74	CCB		CCB	Arsenic	5.38	µg/L	0.269 mg/L

TABLE 13

Blank Contamination: Metals

Charleston Naval Complex, Zone F, AOC 620, Charleston, SC

CNC74	CCB		CCB	Barium	1.92	µg/L	0.096 mg/L
CNC74	CCB		CCB	Cadmium	0.722	µg/L	0.0361 mg/L
CNC74	CCB		CCB	Chromium	2.01	µg/L	0.1005 mg/L

If a target parameter was reported in a field sample, and the concentration was below the level determined to be due to blank contamination (5 times the concentration in the associated QC blank samples), it was flagged as "U", not detected. Initial and continuing calibration blanks were also evaluated for possible contamination.

The results qualified due to blank contamination are listed in [REDACTED].

Recoveries - MS/MSD and LCS

All Matrix Spike (MS), Matrix Spike Duplicate (MSD), and Laboratory Control Sample (LCS) recoveries were within acceptable quality control limits, except as noted in [REDACTED] below.

TABLE 14

MS/MSD, and LCS Recoveries and RPDs Out of QC Limits: Metals

Charleston Naval Complex, Zone F, AOC 620, Charleston, SC

43561	620SB01701 MS/MSD	Antimony	47.9* / 46.9*	80-120			43561 - All	Detects-J, non-detects-UJ
		Barium	131* / 116	80-120			43561 - All	Detects only - J
		Copper	134* / 121*					
		Magnesium	181* / 128*					
		Manganese	200* / 122*					
		Potassium	141* / 118					
50283	620SB03403 MS/MSD	Mercury	87.5* / 178.6*	80-120			50283 - All	Detects only - J
CNC150	620SB06801 MS/MSD	Lead	245* / 73*	80-120	46.3*	35	CNC150 - All	Detects-J, non-detects-UJ

* - out of control limits

Field Duplicate Samples

All Field Duplicate Samples were within acceptable quality control limits, except as noted in **Table 15** below. No flags are applied due to Field Duplicate precision.

TABLE 15

Field Duplicate RPDs Out of QC Limits: Metals
Charleston Naval Complex, Zone F, AOC 620, Charleston, SC

Sample ID	Duplicate ID	Element	Sample Concentration (mg/Kg)	Duplicate Concentration (mg/Kg)	RPD (%)	QC Limit (%)
50283	620SB02301 / 620CB02301	Lead	5.9	33.4	140*	35
50283	620SB03203 / 620CB03203	Lead	1120	2050	58.7*	35
50286	620SB03901 / 620CB03901	Lead	145	83.2	54.2*	35
55785	620SB06402 / 620CB06402	Lead	14.8	60.1	121*	35
73061	620SB07403 / 620CB07403	Lead	2440	396	144*	35
CNC150	620SB07101 / 620CB07101	Lead	1110	140	155*	35
* - out of control limits						

ICP Serial Dilution

All Serial Dilution recoveries were within acceptable quality control limits, except as noted below.

- The serial dilution on sample 620SB01701 in SDG 43561 had a 12.1 percent difference for potassium and a 15.1 percent difference for sodium, with a limit of 10 percent. All samples in SDG 43561 were associated with this serial dilution. All positive results for these analytes were qualified "J" and all non-detects were qualified "UJ".

General Chemistry Analyses

The QA/QC parameters for the General Chemistry analyses for all of the samples were within acceptable control limits, except as noted below.

Holding Times

- All samples in SDG 52481 were analyzed for pH 6 to 7 hours after collection instead of immediately after collection. All pH results in SDG 52481 were qualified, 'J', for holding time.

Rejected Data

The majority of rejected data were associated with reruns and dilutions (there can only be a single valid result per parameter per sample). However, there were selected results qualified as "R", rejected, due to associated QC parameters out of criteria. The rejected data are summarized in **Table 16** below.

TABLE 16

Data Qualification Summary: Rejected Data

Charleston Naval Complex, Zone F, AOC 620, Charleston, SC

55143	55143001	MSLZDRM1M1	SVOA	2-NITROANILINE	50	U	50	R	ug/L	BS
55143	55143001	MSLZDRM1M1	SVOA	3,3'-DICHLOROBENZIDINE	20	U	20	R	ug/L	BS
55143	55143001	MSLZDRM1M1	SVOA	3-NITROANILINE	50	U	50	R	ug/L	BS
55143	55143001	MSLZDRM1M1	SVOA	4-CHLOROANILINE	10	U	10	R	ug/L	BS
55143	55143001	MSLZDRM1M1	SVOA	4-NITROANILINE	50	U	50	R	ug/L	BS
55143	55143001	MSLZDRM1M1	SVOA	CARBAZOLE	10	U	10	R	ug/L	BS
55143	55143002	MSLZDRM2M1	SVOA	2-NITROANILINE	50	U	50	R	ug/L	BS
55143	55143002	MSLZDRM2M1	SVOA	3,3'-DICHLOROBENZIDINE	20	U	20	R	ug/L	BS
55143	55143002	MSLZDRM2M1	SVOA	3-NITROANILINE	50	U	50	R	ug/L	BS
55143	55143002	MSLZDRM2M1	SVOA	4-CHLOROANILINE	10	U	10	R	ug/L	BS
55143	55143002	MSLZDRM2M1	SVOA	4-NITROANILINE	50	U	50	R	ug/L	BS
55143	55143002	MSLZDRM2M1	SVOA	CARBAZOLE	10	U	10	R	ug/L	BS
55143	55143003	MSLZDRM3M1	SVOA	2,4,5-TRICHLOROPHENOL	50	U	50	R	ug/L	SS
55143	55143003	MSLZDRM3M1	SVOA	2,4,6-TRICHLOROPHENOL	10	U	10	R	ug/L	SS
55143	55143003	MSLZDRM3M1	SVOA	2,4-DICHLOROPHENOL	10	U	10	R	ug/L	SS
55143	55143003	MSLZDRM3M1	SVOA	2,4-DIMETHYLPHENOL	10	U	10	R	ug/L	SS
55143	55143003	MSLZDRM3M1	SVOA	2,4-DINITROPHENOL	50	U	50	R	ug/L	SS
55143	55143003	MSLZDRM3M1	SVOA	2-CHLOROPHENOL	10	U	10	R	ug/L	SS
55143	55143003	MSLZDRM3M1	SVOA	2-METHYLPHENOL (o-CRESOL)	10	U	10	R	ug/L	SS
55143	55143003	MSLZDRM3M1	SVOA	2-NITROANILINE	50	U	50	R	ug/L	BS
55143	55143003	MSLZDRM3M1	SVOA	2-NITROPHENOL	10	U	10	R	ug/L	SS
55143	55143003	MSLZDRM3M1	SVOA	3,3'-DICHLOROBENZIDINE	20	U	20	R	ug/L	BS
55143	55143003	MSLZDRM3M1	SVOA	3-NITROANILINE	50	U	50	R	ug/L	BS
55143	55143003	MSLZDRM3M1	SVOA	4,6-DINITRO-2-METHYLPHENOL	50	U	50	R	ug/L	SS

TABLE 16

Data Qualification Summary: Rejected Data

Charleston Naval Complex, Zone F, AOC 620, Charleston, SC

Sample ID	Location	Method	Parameter	Result	Unit	Qualifier	Limit	Rejection Reason	Concentration	Notes
55143	55143003	MSLZDRM3M1	SVOA	4-CHLORO-3-METHYLPHENOL	10	U	10	R	ug/L	SS
55143	55143003	MSLZDRM3M1	SVOA	4-CHLOROANILINE	10	U	10	R	ug/L	BS
55143	55143003	MSLZDRM3M1	SVOA	4-NITROANILINE	50	U	50	R	ug/L	BS
55143	55143003	MSLZDRM3M1	SVOA	4-NITROPHENOL	50	U	50	R	ug/L	SS
55143	55143003	MSLZDRM3M1	SVOA	Benzoic acid	50	U	50	R	ug/L	SS
55143	55143003	MSLZDRM3M1	SVOA	CARBAZOLE	10	U	10	R	ug/L	BS
55143	55143003	MSLZDRM3M1	SVOA	m,p-Cresols	10	U	10	R	ug/L	SS
55143	55143003	MSLZDRM3M1	SVOA	PENTACHLOROPHENOL	50	U	50	R	ug/L	SS
55143	55143003	MSLZDRM3M1	SVOA	PHENOL	10	U	10	R	ug/L	SS
55143	55143003	MSLZDRM3M1	SVOA	PYRENE	10	U	10	R	ug/L	SS

Conclusion

A review of the analytical data submitted regarding the investigation of Zone F, AOC 620 at the Charleston Naval Complex, Charleston, South Carolina by CH2M HILL has been completed. An overall evaluation of the data indicates that the sample handling, shipment, and analytical procedures have been adequately completed, and that the analytical results should be considered usable as qualified.

As discussed above, there were specific results that were rejected, in which the data cannot be used. With the exception of these results, the validation review demonstrated that the analytical systems were generally in control and the data can be used in the decision making process.

Attachment 1 - Changed Qualifiers and Results
Zone F, AOC 620 - Data Validation

GENCHEM	SW9045	pH	52481	620SB05401	52481010	SO	5.8	=	5.8	J	SU	HT
GENCHEM	SW9045	pH	52481	620SB05402	52481011	SO	6.18	=	6.18	J	SU	HT
GENCHEM	SW9045	pH	52481	620SB05701	52481012	SO	6.95	=	6.95	J	SU	HT
GENCHEM	SW9045	pH	52481	620SB05702	52481013	SO	6.57	=	6.57	J	SU	HT
GENCHEM	SW9045	pH	52481	620SB05802	52481014	SO	5.06	=	5.06	J	SU	HT
GENCHEM	SW9045	pH	52481	620SB05901	52481015	SO	4.85	=	4.85	J	SU	HT
METAL	SW6010	ANTIMONY	43561	620SB01701	43561003	SO	0.673	BN	0.673	J	mg/Kg	MS
METAL	SW6010	ANTIMONY	43561	620SB01703	43561004	SO	1.11	BN	1.11	J	mg/Kg	MS
METAL	SW6010	ANTIMONY	43561	620SB01801	43561005	SO	48.5	N	48.5	J	mg/Kg	MS
METAL	SW6010	ANTIMONY	43561	620SB01803	43561006	SO	2.09	BN	2.09	J	mg/Kg	MS
METAL	SW6010	ANTIMONY	43561	620CB01801	43561007	SO	59.8	N	59.8	J	mg/Kg	MS
METAL	SW6010	BARIUM	43561	620SB01701	43561003	SO	23.2	BN	23.2	J	mg/Kg	MS
METAL	SW6010	BARIUM	43561	620SB01703	43561004	SO	38.8	BN	38.8	J	mg/Kg	MS
METAL	SW6010	BARIUM	43561	620SB01801	43561005	SO	76	N	76	J	mg/Kg	MS
METAL	SW6010	BARIUM	43561	620SB01803	43561006	SO	48.1	BN	48.1	J	mg/Kg	MS
METAL	SW6010	BARIUM	43561	620CB01801	43561007	SO	61.4	N	61.4	J	mg/Kg	MS
METAL	SW6010	BARIUM	55143	MSLZDRM1M1	55143001	WG	1.16	B	1.16	U	ug/L	BL
METAL	SW6010	BARIUM	55143	MSLZDRM2M1	55143002	WG	6.09	B	6.09	J	ug/L	IB
METAL	SW6010	BARIUM	55143	MSLZDRM3M1	55143003	WG	3.65	B	3.65	U	ug/L	BL
METAL	SW6010	BARIUM, TCLP	CNC74	620VA001M1	S241646*1	SO	0.29	B	0.29	J	mg/L	IB
METAL	SW6010	BARIUM, TCLP	CNC74	620VA002M1	S241646*2	SO	0.34	B	0.34	J	mg/L	IB
METAL	SW6010	BARIUM, TCLP	CNC74	620VA003M1	S241646*3	SO	0.26	B	0.26	J	mg/L	IB
METAL	SW6010	BARIUM, TCLP	CNC74	620VA004M1	S241646*4	SO	0.2	B	0.2	J	mg/L	IB
METAL	SW6010	BERYLLIUM	43561	620SB01701	43561003	SO	0.285	B	0.285	J	mg/Kg	IB
METAL	SW6010	BERYLLIUM	43561	620SB01801	43561005	SO	0.042	B	0.042	U	mg/Kg	BL
METAL	SW6010	BERYLLIUM	43561	620SB01803	43561006	SO	0.255	B	0.255	J	mg/Kg	IB
METAL	SW6010	BERYLLIUM	43561	620CB01801	43561007	SO	0.054	B	0.054	U	mg/Kg	BL
METAL	SW6010	CADMIUM	43561	620SB01701	43561003	SO	0.655	B	0.655	J	mg/Kg	IB
METAL	SW6010	CADMIUM	43561	620SB01801	43561005	SO	0.09	B	0.09	U	mg/Kg	BL
METAL	SW6010	CADMIUM	43561	620CB01801	43561007	SO	0.109	B	0.109	U	mg/Kg	BL
METAL	SW6010	CADMIUM	55143	MSLZDRM1M1	55143001	WG	3.29	B	3.29	U	ug/L	BL
METAL	SW6010	CADMIUM	55143	MSLZDRM2M1	55143002	WG	0.92	B	0.92	U	ug/L	BL

Attachment 1 - Change Qualifiers and Results
Zone F, AOC Data Validation

METAL	SW6010	CADMIUM	55143	MSLZDRM3M1	55143003	WG	1.94	B	1.94	U	ug/L	BL
METAL	SW6010	CADMIUM, TCLP	CNC74	620VA002M1	S241646*2	SO	0.0078	B	0.0078	U	mg/L	BL
METAL	SW6010	CADMIUM, TCLP	CNC74	620VA004M1	S241646*4	SO	0.014	B	0.014	U	mg/L	BL
METAL	SW6010	CALCIUM	43561	620SB01801	43561005	SO	792		792	J	mg/Kg	IB
METAL	SW6010	CALCIUM	43561	620SB01803	43561006	SO	588		588	J	mg/Kg	IB
METAL	SW6010	CALCIUM	43561	620CB01801	43561007	SO	1130	B*	1130	J	mg/Kg	IB
METAL	SW6010	CHROMIUM, TOTAL	55143	MSLZDRM2M1	55143002	WG	1.21	B	1.21	U	ug/L	BL
METAL	SW6010	CHROMIUM, TOTAL	55143	MSLZDRM3M1	55143003	WG	1.47	B	1.47	U	ug/L	BL
METAL	SW6010	COBALT	43561	620SB01701	43561003	SO	1.91	B	1.91	J	mg/Kg	IB
METAL	SW6010	COBALT	43561	620SB01703	43561004	SO	8.1	B	8.1	J	mg/Kg	IB
METAL	SW6010	COBALT	43561	620SB01801	43561005	SO	0.779	B	0.779	J	mg/Kg	IB
METAL	SW6010	COBALT	43561	620SB01803	43561006	SO	2.39	B	2.39	J	mg/Kg	IB
METAL	SW6010	COBALT	43561	620CB01801	43561007	SO	0.941	B	0.941	J	mg/Kg	IB
METAL	SW6010	COPPER	43561	620SB01701	43561003	SO	31.1	N	31.1	J	mg/Kg	MS
METAL	SW6010	COPPER	43561	620SB01703	43561004	SO	57.5	N	57.5	J	mg/Kg	MS
METAL	SW6010	COPPER	43561	620SB01801	43561005	SO	10.2	N	10.2	J	mg/Kg	MS
METAL	SW6010	COPPER	43561	620SB01803	43561006	SO	35.2	N	35.2	J	mg/Kg	MS
METAL	SW6010	COPPER	43561	620CB01801	43561007	SO	12.3	N	12.3	J	mg/Kg	MS
METAL	SW6010	LEAD	50283D	620GW004L1	50290004	WG	3.56	=	3.56	U	ug/L	BL
METAL	SW6010	LEAD	CNC150	620SB06801	S248528*1	SO	110	N	110	J	mg/kg	MS,MD
METAL	SW6010	LEAD	CNC150	620SB06901	S248528*2	SO	160	N	160	J	mg/kg	MS,MD
METAL	SW6010	LEAD	CNC150	620SB07001	S248528*3	SO	180	N	180	J	mg/kg	MS,MD
METAL	SW6010	LEAD	CNC150	620SB07101	S248528*4	SO	1100	N	1100	J	mg/kg	MS,MD
METAL	SW6010	LEAD	CNC150	620CB07101	S248528*5	SO	140	N	140	J	mg/kg	MS,MD
METAL	SW6010	LEAD, SPLP	50283	620SB03501	50283015	SO	40.4	B	40.4	J	ug/L	IB
METAL	SW6010	LEAD, SPLP	50283B	620SB03803	50286012	SO	138	B	138	J	ug/L	IB
METAL	SW6010	LEAD, SPLP	50283C	620SB04301	50288002	SO	61.1	B	61.1	J	ug/L	IB
METAL	SW6010	LEAD, SPLP	52481B	620SB05301	52483001	SO	33.4	B	33.4	J	ug/L	IB
METAL	SW6010	LEAD, SPLP	52481B	620SB05302	52483002	SO	26.8	B	26.8	J	ug/L	IB
METAL	SW6010	LEAD, SPLP	52481B	620CB05302	52483003	SO	30.3	B	30.3	J	ug/L	IB
METAL	SW6010	LEAD, SPLP	52481B	620SB05501	52483004	SO	24.8	B	24.8	J	ug/L	IB
METAL	SW6010	LEAD, SPLP	52481B	620SB05502	52483005	SO	28.4	B	28.4	J	ug/L	IB

Attachment 1 - Changed Qualifiers and Results
Zone F, AOC 620 - Data Validation

METAL	SW6010	LEAD, TCLP	52481B	620SB05701	52483010	SO	273	B	273	J	ug/L	IB
METAL	SW6010	LEAD, TCLP	52481B	620SB05702	52483011	SO	84	B	84	J	ug/L	IB
METAL	SW6010	MAGNESIUM	43561	620SB01701	43561003	SO	630	BN	630	J	mg/Kg	MS
METAL	SW6010	MAGNESIUM	43561	620SB01703	43561004	SO	2510	N	2510	J	mg/Kg	MS
METAL	SW6010	MAGNESIUM	43561	620SB01801	43561005	SO	195	BN	195	J	mg/Kg	MS
METAL	SW6010	MAGNESIUM	43561	620SB01803	43561006	SO	1140	BN	1140	J	mg/Kg	MS
METAL	SW6010	MAGNESIUM	43561	620CB01801	43561007	SO	246	BN	246	J	mg/Kg	MS
METAL	SW6010	MANGANESE	43561	620SB01701	43561003	SO	83.9	N	83.9	J	mg/Kg	MS
METAL	SW6010	MANGANESE	43561	620SB01703	43561004	SO	400	N	400	J	mg/Kg	MS
METAL	SW6010	MANGANESE	43561	620SB01801	43561005	SO	9.95	N	9.95	J	mg/Kg	MS
METAL	SW6010	MANGANESE	43561	620SB01803	43561006	SO	23.9	N	23.9	J	mg/Kg	MS
METAL	SW6010	MANGANESE	43561	620CB01801	43561007	SO	14.5	N	14.5	J	mg/Kg	MS
METAL	SW7471	MERCURY	50283	620SB03403	50283001	SO	0.576	N	0.576	J	mg/kg	MS
METAL	SW7471	MERCURY	50283	620SB03401	50283002	SO	0.361	N	0.361	J	mg/kg	MS
METAL	SW7471	MERCURY	50283	620SB02201	50283003	SO	0.066	N	0.066	J	mg/kg	MS
METAL	SW7471	MERCURY	50283	620SB02203	50283004	SO	0.101	N	0.101	J	mg/kg	MS
METAL	SW7471	MERCURY	50283	620SB02301	50283005	SO	0.031	N	0.031	J	mg/kg	MS
METAL	SW7471	MERCURY	50283	620CB02301	50283006	SO	0.016	N	0.016	J	mg/kg	MS
METAL	SW7471	MERCURY	50283	620SB02901	50283007	SO	0.034	N	0.034	J	mg/kg	MS
METAL	SW7471	MERCURY	50283	620SB03001	50283008	SO	1.68	N	1.68	J	mg/kg	MS
METAL	SW7470	MERCURY	55143	MSLZDRM1M1	55143001	WG	0.158	B	0.158	J	ug/L	IB
METAL	SW6010	NICKEL	43561	620SB01701	43561003	SO	6.52	B	6.52	J	mg/Kg	IB
METAL	SW6010	NICKEL	43561	620SB01801	43561005	SO	4.23	B	4.23	J	mg/Kg	IB
METAL	SW6010	NICKEL	43561	620SB01803	43561006	SO	5.6	B	5.6	J	mg/Kg	IB
METAL	SW6010	NICKEL	43561	620CB01801	43561007	SO	2.99	B	2.99	J	mg/Kg	IB
METAL	SW6010	POTASSIUM	43561	620SB01701	43561003	SO	319		319	J	mg/Kg	MS,SD
METAL	SW6010	POTASSIUM	43561	620SB01703	43561004	SO	1230	BEN	1230	J	mg/Kg	MS,SD
METAL	SW6010	POTASSIUM	43561	620SB01801	43561005	SO	237		237	J	mg/Kg	MS,SD
METAL	SW6010	POTASSIUM	43561	620SB01803	43561006	SO	1500	BEN	1500	J	mg/Kg	MS,SD
METAL	SW6010	POTASSIUM	43561	620CB01801	43561007	SO	296		296	J	mg/Kg	MS,SD
METAL	SW6010	SELENIUM	43561	620SB01803	43561006	SO	0.53	B	0.53	J	mg/Kg	IB
METAL	SW6010	SILVER	43561	620SB01701	43561003	SO	0.243	B	0.243	U	mg/Kg	BL

Attachment 1 - Changed Qualifiers and Results
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METAL	SW6010	SILVER	43561	620SB01703	43561004	SO	0.472	B	0.472	U	mg/Kg	BL
METAL	SW6010	SILVER	43561	620SB01803	43561006	SO	0.528	B	0.528	U	mg/Kg	BL
METAL	SW6010	SILVER	55143	MSLZDRM1M1	55143001	WG	1.62	B	1.62	U	ug/L	BL
METAL	SW6010	SILVER	55143	MSLZDRM2M1	55143002	WG	1.15	B	1.15	U	ug/L	BL
METAL	SW6010	SILVER	55143	MSLZDRM3M1	55143003	WG	0.703	B	0.703	U	ug/L	BL
METAL	SW6010	SODIUM	43561	620SB01701	43561003	SO	57.2		57.2	UJ	mg/Kg	BL,SD
METAL	SW6010	SODIUM	43561	620SB01703	43561004	SO	128		128	J	mg/Kg	SD
METAL	SW6010	SODIUM	43561	620SB01801	43561005	SO	22.9		22.9	J	mg/Kg	SD
METAL	SW6010	SODIUM	43561	620SB01803	43561006	SO	269		269	J	mg/Kg	SD
METAL	SW6010	SODIUM	43561	620CB01801	43561007	SO	29.2		29.2	UJ	mg/Kg	BL,SD
METAL	SW6010	THALLIUM	43561	620SB01703	43561004	SO	0.957	B	0.957	J	mg/Kg	IB
METAL	SW6010	VANADIUM	43561	620SB01801	43561005	SO	6.99	B	6.99	J	mg/Kg	IB
METAL	SW6010	VANADIUM	43561	620CB01801	43561007	SO	8.68	B	8.68	J	mg/Kg	IB
PCB	SW8082	PCB-1016 (AROCHLOR 1016)	44280	620SB01903RE	44280001	SO	78	U	78	R	ug/Kg	RE
PCB	SW8082	PCB-1016 (AROCHLOR 1016)	44280	620SB02003	44280002	SO	37.7	U	37.7	UJ	ug/Kg	SS
PCB	SW8082	PCB-1016 (AROCHLOR 1016)	44280	620SB02003RE	44280002	SO	37.7	U	37.7	R	ug/Kg	RE
PCB	SW8082	PCB-1016 (AROCHLOR 1016)	44280	620SB02103	44280003	SO	39.5	U	39.5	UJ	ug/Kg	SS
PCB	SW8082	PCB-1016 (AROCHLOR 1016)	44280	620SB02103RE	44280003	SO	39.5	U	39.5	R	ug/Kg	RE
PCB	SW8082	PCB-1221 (AROCHLOR 1221)	44280	620SB01903RE	44280001	SO	78	U	78	R	ug/Kg	RE
PCB	SW8082	PCB-1221 (AROCHLOR 1221)	44280	620SB02003	44280002	SO	37.7	U	37.7	UJ	ug/Kg	SS
PCB	SW8082	PCB-1221 (AROCHLOR 1221)	44280	620SB02003RE	44280002	SO	37.7	U	37.7	R	ug/Kg	RE
PCB	SW8082	PCB-1221 (AROCHLOR 1221)	44280	620SB02103	44280003	SO	39.5	U	39.5	UJ	ug/Kg	SS
PCB	SW8082	PCB-1221 (AROCHLOR 1221)	44280	620SB02103RE	44280003	SO	39.5	U	39.5	R	ug/Kg	RE
PCB	SW8082	PCB-1232 (AROCHLOR 1232)	44280	620SB01903RE	44280001	SO	78	U	78	R	ug/Kg	RE
PCB	SW8082	PCB-1232 (AROCHLOR 1232)	44280	620SB02003	44280002	SO	37.7	U	37.7	UJ	ug/Kg	SS
PCB	SW8082	PCB-1232 (AROCHLOR 1232)	44280	620SB02003RE	44280002	SO	37.7	U	37.7	R	ug/Kg	RE
PCB	SW8082	PCB-1232 (AROCHLOR 1232)	44280	620SB02103	44280003	SO	39.5	U	39.5	UJ	ug/Kg	SS
PCB	SW8082	PCB-1232 (AROCHLOR 1232)	44280	620SB02103RE	44280003	SO	39.5	U	39.5	R	ug/Kg	RE
PCB	SW8082	PCB-1242 (AROCHLOR 1242)	44280	620SB01903RE	44280001	SO	78	U	78	R	ug/Kg	RE
PCB	SW8082	PCB-1242 (AROCHLOR 1242)	44280	620SB02003	44280002	SO	37.7	U	37.7	UJ	ug/Kg	SS
PCB	SW8082	PCB-1242 (AROCHLOR 1242)	44280	620SB02003RE	44280002	SO	37.7	U	37.7	R	ug/Kg	RE
PCB	SW8082	PCB-1242 (AROCHLOR 1242)	44280	620SB02103	44280003	SO	39.5	U	39.5	UJ	ug/Kg	SS

Attachment 1 - Changed Qualifiers and Results
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PCB	SW8082	PCB-1242 (AROCHLOR 1242)	44280	620SB02103RE	44280003	SO	39.5	U	39.5	R	ug/Kg	RE
PCB	SW8082	PCB-1248 (AROCHLOR 1248)	44280	620SB01903RE	44280001	SO	78	U	78	R	ug/Kg	RE
PCB	SW8082	PCB-1248 (AROCHLOR 1248)	44280	620SB02003	44280002	SO	37.7	U	37.7	UJ	ug/Kg	SS
PCB	SW8082	PCB-1248 (AROCHLOR 1248)	44280	620SB02003RE	44280002	SO	37.7	U	37.7	R	ug/Kg	RE
PCB	SW8082	PCB-1248 (AROCHLOR 1248)	44280	620SB02103	44280003	SO	39.5	U	39.5	UJ	ug/Kg	SS
PCB	SW8082	PCB-1248 (AROCHLOR 1248)	44280	620SB02103RE	44280003	SO	39.5	U	39.5	R	ug/Kg	RE
PCB	SW8082	PCB-1254 (AROCHLOR 1254)	44280	620SB01903RE	44280001	SO	390	=	390	R	ug/Kg	RE
PCB	SW8082	PCB-1254 (AROCHLOR 1254)	44280	620SB02003	44280002	SO	9.1	=	9.1	J	ug/Kg	2C,SS
PCB	SW8082	PCB-1254 (AROCHLOR 1254)	44280	620SB02003RE	44280002	SO	6	=	6	R	ug/Kg	RE
PCB	SW8082	PCB-1254 (AROCHLOR 1254)	44280	620SB02103	44280003	SO	80.2	U	80.2	UJ	ug/Kg	SS
PCB	SW8082	PCB-1254 (AROCHLOR 1254)	44280	620SB02103RE	44280003	SO	10.4	=	10.4	R	ug/Kg	RE
PCB	SW8082	PCB-1260 (AROCHLOR 1260)	43561	620SB01601	43561002	SO	45.8	J	45.8	J	ug/Kg	
PCB	SW8082	PCB-1260 (AROCHLOR 1260)	44280	620SB01903	44280001	SO	42.8	J	42.8	J	ug/Kg	BS,BD
PCB	SW8082	PCB-1260 (AROCHLOR 1260)	44280	620SB01903RE	44280001	SO	78	U	78	R	ug/Kg	RE
PCB	SW8082	PCB-1260 (AROCHLOR 1260)	44280	620SB02003	44280002	SO	76.5	U	76.5	UJ	ug/Kg	SS,BS,BD
PCB	SW8082	PCB-1260 (AROCHLOR 1260)	44280	620SB02003RE	44280002	SO	76.5	U	76.5	R	ug/Kg	RE
PCB	SW8082	PCB-1260 (AROCHLOR 1260)	44280	620SB02103	44280003	SO	15.6	=	15.6	J	ug/Kg	SS,BS,BD
PCB	SW8082	PCB-1260 (AROCHLOR 1260)	44280	620SB02103RE	44280003	SO	48.9	J	48.9	R	ug/Kg	RE
SVOA	SW8270	2,4,5-TRICHLOROPHENOL	55143	MSLZDRM3M1	55143003	WG	50	U	50	R	ug/L	SS
SVOA	SW8270	2,4,6-TRICHLOROPHENOL	55143	MSLZDRM3M1	55143003	WG	10	U	10	R	ug/L	SS
SVOA	SW8270	2,4-DICHLOROPHENOL	55143	MSLZDRM3M1	55143003	WG	10	U	10	R	ug/L	SS
SVOA	SW8270	2,4-DIMETHYLPHENOL	55143	MSLZDRM3M1	55143003	WG	10	U	10	R	ug/L	SS
SVOA	SW8270	2,4-DINITROPHENOL	55143	MSLZDRM2M1	55143002	WG	50	U	50	UJ	ug/L	IC
SVOA	SW8270	2,4-DINITROPHENOL	55143	MSLZDRM3M1	55143003	WG	50	U	50	R	ug/L	SS
SVOA	SW8270	2-CHLOROPHENOL	55143	MSLZDRM3M1	55143003	WG	10	U	10	R	ug/L	SS
SVOA	SW8270	2-METHYLPHENOL (o-CRESOL)	55143	MSLZDRM3M1	55143003	WG	10	U	10	R	ug/L	SS
SVOA	SW8270	2-NITROANILINE	55143	MSLZDRM1M1	55143001	WG	50	U	50	R	ug/L	BS
SVOA	SW8270	2-NITROANILINE	55143	MSLZDRM2M1	55143002	WG	50	U	50	R	ug/L	BS
SVOA	SW8270	2-NITROANILINE	55143	MSLZDRM3M1	55143003	WG	50	U	50	R	ug/L	BS
SVOA	SW8270	2-NITROPHENOL	55143	MSLZDRM3M1	55143003	WG	10	U	10	R	ug/L	SS
SVOA	SW8270	3,3'-DICHLOROBENZIDINE	55143	MSLZDRM1M1	55143001	WG	20	U	20	R	ug/L	BS
SVOA	SW8270	3,3'-DICHLOROBENZIDINE	55143	MSLZDRM2M1	55143002	WG	20	U	20	R	ug/L	BS

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SVOA	SW8270	3,3'-DICHLOROBENZIDINE	55143	MSLZDRM3M1	55143003	WG	20	U	20	R	ug/L	BS
SVOA	SW8270	3-NITROANILINE	55143	MSLZDRM1M1	55143001	WG	50	U	50	R	ug/L	BS
SVOA	SW8270	3-NITROANILINE	55143	MSLZDRM2M1	55143002	WG	50	U	50	R	ug/L	BS
SVOA	SW8270	3-NITROANILINE	55143	MSLZDRM3M1	55143003	WG	50	U	50	R	ug/L	BS
SVOA	SW8270	4,6-DINITRO-2-METHYLPHENOL	43561	620SB01701	43561003	SO	7280	U	7280	UJ	ug/Kg	IC
SVOA	SW8270	4,6-DINITRO-2-METHYLPHENOL	43561	620SB01703	43561004	SO	2590	U	2590	UJ	ug/Kg	IC
SVOA	SW8270	4,6-DINITRO-2-METHYLPHENOL	43561	620SB01801	43561005	SO	7720	U	7720	UJ	ug/Kg	IC
SVOA	SW8270	4,6-DINITRO-2-METHYLPHENOL	43561	620SB01803	43561006	SO	2590	U	2590	UJ	ug/Kg	IC
SVOA	SW8270	4,6-DINITRO-2-METHYLPHENOL	43561	620CB01801	43561007	SO	1980	U	1980	UJ	ug/Kg	IC
SVOA	SW8270	4,6-DINITRO-2-METHYLPHENOL	55143	MSLZDRM3M1	55143003	WG	50	U	50	R	ug/L	SS
SVOA	SW8270	4-CHLORO-3-METHYLPHENOL	55143	MSLZDRM3M1	55143003	WG	10	U	10	R	ug/L	SS
SVOA	SW8270	4-CHLOROANILINE	55143	MSLZDRM1M1	55143001	WG	10	U	10	R	ug/L	BS
SVOA	SW8270	4-CHLOROANILINE	55143	MSLZDRM2M1	55143002	WG	10	U	10	R	ug/L	BS
SVOA	SW8270	4-CHLOROANILINE	55143	MSLZDRM3M1	55143003	WG	10	U	10	R	ug/L	BS
SVOA	SW8270	4-NITROANILINE	43561	620SB01701	43561003	SO	7280	U	7280	UJ	ug/Kg	CC
SVOA	SW8270	4-NITROANILINE	55143	MSLZDRM1M1	55143001	WG	50	U	50	R	ug/L	BS
SVOA	SW8270	4-NITROANILINE	55143	MSLZDRM2M1	55143002	WG	50	U	50	R	ug/L	BS
SVOA	SW8270	4-NITROANILINE	55143	MSLZDRM3M1	55143003	WG	50	U	50	R	ug/L	BS
SVOA	SW8270	4-NITROPHENOL	55143	MSLZDRM3M1	55143003	WG	50	U	50	R	ug/L	SS
SVOA	SW8270	BENZO(a)ANTHRACENE	55143	MSLZDRM1M1	55143001	WG	10	U	10	UJ	ug/L	IS
SVOA	SW8270	BENZO(a)PYRENE	43561	620CB01801	43561007	SO	75.5	J	75.5	J	ug/Kg	IS
SVOA	SW8270	BENZO(a)PYRENE	55143	MSLZDRM1M1	55143001	WG	1	U	1	UJ	ug/L	IS
SVOA	SW8270	BENZO(a)PYRENE	55143	MSLZDRM2M1	55143002	WG	1	U	1	UJ	ug/L	IS
SVOA	SW8270	BENZO(b)FLUORANTHENE	43561	620SB01701	43561003	SO	1040	J	1040	J	ug/Kg	IC
SVOA	SW8270	BENZO(b)FLUORANTHENE	43561	620SB01703	43561004	SO	389	J	389	J	ug/Kg	IC
SVOA	SW8270	BENZO(b)FLUORANTHENE	43561	620SB01801	43561005	SO	1150	J	1150	J	ug/Kg	IC
SVOA	SW8270	BENZO(b)FLUORANTHENE	43561	620SB01803	43561006	SO	375	J	375	J	ug/Kg	IC
SVOA	SW8270	BENZO(b)FLUORANTHENE	43561	620CB01801	43561007	SO	400	J	400	J	ug/Kg	IC, IS
SVOA	SW8270	BENZO(b)FLUORANTHENE	55143	MSLZDRM1M1	55143001	WG	10	U	10	UJ	ug/L	IS
SVOA	SW8270	BENZO(b)FLUORANTHENE	55143	MSLZDRM2M1	55143002	WG	10	U	10	UJ	ug/L	IS
SVOA	SW8270	BENZO(g,h,i)PERYLENE	43561	620SB01703	43561004	SO	24.7	J	24.7	J	ug/Kg	CC
SVOA	SW8270	BENZO(g,h,i)PERYLENE	43561	620SB01801	43561005	SO	72.9	J	72.9	J	ug/Kg	CC

Attachment 1 - Changed Qualifiers and Results
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SVOA	SW8270	BENZO(g,h,i)PERYLENE	43561	620SB01803	43561006	SO	18.8	J	18.8	J	ug/Kg	CC
SVOA	SW8270	BENZO(g,h,i)PERYLENE	43561	620CB01801	43561007	SO	60.8	J	60.8	J	ug/Kg	IS, CC
SVOA	SW8270	BENZO(g,h,i)PERYLENE	55143	MSLZDRM1M1	55143001	WG	10	U	10	UJ	ug/L	IS
SVOA	SW8270	BENZO(g,h,i)PERYLENE	55143	MSLZDRM2M1	55143002	WG	10	U	10	UJ	ug/L	IS
SVOA	SW8270	BENZO(k)FLUORANTHENE	43561	620SB01703	43561004	SO	32	J	32	J	ug/Kg	CC
SVOA	SW8270	BENZO(k)FLUORANTHENE	43561	620SB01801	43561005	SO	136	J	136	J	ug/Kg	CC
SVOA	SW8270	BENZO(k)FLUORANTHENE	43561	620SB01803	43561006	SO	30.4	J	30.4	J	ug/Kg	CC
SVOA	SW8270	BENZO(k)FLUORANTHENE	43561	620CB01801	43561007	SO	408	U	408	UJ	ug/Kg	IC, IS
SVOA	SW8270	BENZO(k)FLUORANTHENE	55143	MSLZDRM1M1	55143001	WG	10	U	10	UJ	ug/L	IS
SVOA	SW8270	BENZO(k)FLUORANTHENE	55143	MSLZDRM2M1	55143002	WG	10	U	10	UJ	ug/L	IS
SVOA	SW8270	Benzoic acid	43561	620SB01701	43561003	SO	7280	U	7280	UJ	ug/Kg	IC
SVOA	SW8270	Benzoic acid	43561	620SB01703	43561004	SO	2590	U	2590	UJ	ug/Kg	IC, CC
SVOA	SW8270	Benzoic acid	43561	620SB01801	43561005	SO	7720	U	7720	UJ	ug/Kg	IC, CC
SVOA	SW8270	Benzoic acid	43561	620SB01803	43561006	SO	2590	U	2590	UJ	ug/Kg	IC, CC
SVOA	SW8270	Benzoic acid	43561	620CB01801	43561007	SO	1980	U	1980	UJ	ug/Kg	IC, CC
SVOA	SW8270	Benzoic acid	55143	MSLZDRM3M1	55143003	WG	50	U	50	R	ug/L	SS
SVOA	SW8270	BENZYL BUTYL PHTHALATE	55143	MSLZDRM1M1	55143001	WG	10	U	10	UJ	ug/L	IS
SVOA	SW8270	bis(2-ETHYLHEXYL) PHTHALATE	43561	620SB01701	43561003	SO	76.2	JB	1500	U	ug/Kg	BL
SVOA	SW8270	bis(2-ETHYLHEXYL) PHTHALATE	43561	620SB01703	43561004	SO	46.7	JB	534	U	ug/Kg	BL
SVOA	SW8270	bis(2-ETHYLHEXYL) PHTHALATE	43561	620SB01801	43561005	SO	312	JB	1590	U	ug/Kg	BL
SVOA	SW8270	bis(2-ETHYLHEXYL) PHTHALATE	43561	620SB01803	43561006	SO	21.5	JB	535	U	ug/Kg	BL
SVOA	SW8270	bis(2-ETHYLHEXYL) PHTHALATE	43561	620CB01801	43561007	SO	299	JB	408	U	ug/Kg	BL
SVOA	SW8270	bis(2-ETHYLHEXYL) PHTHALATE	55143	MSLZDRM1M1	55143001	WG	7.2	JB	10	U	ug/L	BL
SVOA	SW8270	bis(2-ETHYLHEXYL) PHTHALATE	55143	MSLZDRM2M1	55143002	WG	1.2	JB	10	U	ug/L	BL
SVOA	SW8270	bis(2-ETHYLHEXYL) PHTHALATE	55143	MSLZDRM3M1	55143003	WG	7.2	JB	10	U	ug/L	BL
SVOA	SW8270	CARBAZOLE	43561	620CB01801	43561007	SO	408	U	408	UJ	ug/Kg	IS
SVOA	SW8270	CARBAZOLE	55143	MSLZDRM1M1	55143001	WG	10	U	10	R	ug/L	BS
SVOA	SW8270	CARBAZOLE	55143	MSLZDRM2M1	55143002	WG	10	U	10	R	ug/L	BS
SVOA	SW8270	CARBAZOLE	55143	MSLZDRM3M1	55143003	WG	10	U	10	R	ug/L	BS
SVOA	SW8270	CHRYSENE	55143	MSLZDRM1M1	55143001	WG	10	U	10	UJ	ug/L	IS
SVOA	SW8270	DIBENZ(a,h)ANTHRACENE	43561	620CB01801	43561007	SO	408	U	408	UJ	ug/Kg	IS
SVOA	SW8270	DIBENZ(a,h)ANTHRACENE	55143	MSLZDRM1M1	55143001	WG	10	U	10	UJ	ug/L	IS

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SVOA	SW8270	DIBENZ(a,h)ANTHRACENE	55143	MSLZDRM2M1	55143002	WG	10	U	10	UJ	ug/L	IS
SVOA	SW8270	DI-n-OCTYLPHTHALATE	55143	MSLZDRM1M1	55143001	WG	10	U	10	UJ	ug/L	IS
SVOA	SW8270	DI-n-OCTYLPHTHALATE	55143	MSLZDRM2M1	55143002	WG	10	U	10	UJ	ug/L	IS
SVOA	SW8270	HEXACHLOROCYCLOPENTADIENE	43561	620SB01703	43561004	SO	534	U	534	UJ	ug/Kg	CC
SVOA	SW8270	HEXACHLOROCYCLOPENTADIENE	43561	620SB01801	43561005	SO	1590	U	1590	UJ	ug/Kg	CC
SVOA	SW8270	HEXACHLOROCYCLOPENTADIENE	43561	620SB01803	43561006	SO	535	U	535	UJ	ug/Kg	CC
SVOA	SW8270	HEXACHLOROCYCLOPENTADIENE	43561	620CB01801	43561007	SO	408	U	408	UJ	ug/Kg	CC
SVOA	SW8270	INDENO(1,2,3-c,d)PYRENE	55143	MSLZDRM1M1	55143001	WG	10	U	10	UJ	ug/L	IS
SVOA	SW8270	INDENO(1,2,3-c,d)PYRENE	55143	MSLZDRM2M1	55143002	WG	10	U	10	UJ	ug/L	IS
SVOA	SW8270	m,p-Cresols	55143	MSLZDRM3M1	55143003	WG	10	U	10	R	ug/L	SS
SVOA	SW8270	NAPHTHALENE	55143	MSLZDRM2M1	55143002	WG	10	U	10	UJ	ug/L	IC
SVOA	SW8270	PENTACHLOROPHENOL	43561	620SB01701	43561003	SO	7280	U	7280	UJ	ug/Kg	IC
SVOA	SW8270	PENTACHLOROPHENOL	43561	620SB01703	43561004	SO	2590	U	2590	UJ	ug/Kg	IC
SVOA	SW8270	PENTACHLOROPHENOL	43561	620SB01801	43561005	SO	7720	U	7720	UJ	ug/Kg	IC
SVOA	SW8270	PENTACHLOROPHENOL	43561	620SB01803	43561006	SO	2590	U	2590	UJ	ug/Kg	IC
SVOA	SW8270	PENTACHLOROPHENOL	43561	620CB01801	43561007	SO	1980	U	1980	UJ	ug/Kg	IC
SVOA	SW8270	PENTACHLOROPHENOL	55143	MSLZDRM3M1	55143003	WG	50	U	50	R	ug/L	SS
SVOA	SW8270	PHENOL	55143	MSLZDRM3M1	55143003	WG	10	U	10	R	ug/L	SS
SVOA	SW8270	PYRENE	55143	MSLZDRM3M1	55143003	WG	10	U	10	R	ug/L	SS
VOA	SW8260	1,1,1-TRICHLOROETHANE	55143	MSLZDRM1M1LR	55143001	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	1,1,1-TRICHLOROETHANE	55143	MSLZDRM3M1LR	55143003	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	1,1,2,2-TETRACHLOROETHANE	43561	620SB01701	43561003	SO	5.8	U	5.8	UJ	ug/Kg	IS
VOA	SW8260	1,1,2,2-TETRACHLOROETHANE	43561	620SB01703	43561004	SO	9.6	U	9.6	UJ	ug/Kg	IS
VOA	SW8260	1,1,2,2-TETRACHLOROETHANE	43561	620SB01801	43561005	SO	6.2	U	6.2	UJ	ug/Kg	IS
VOA	SW8260	1,1,2,2-TETRACHLOROETHANE	43561	620SB01803	43561006	SO	9.9	U	9.9	UJ	ug/Kg	IS
VOA	SW8260	1,1,2,2-TETRACHLOROETHANE	43561	620CB01801	43561007	SO	7.2	U	7.2	UJ	ug/Kg	IS
VOA	SW8260	1,1,2,2-TETRACHLOROETHANE	55143	MSLZDRM1M1LR	55143001	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	1,1,2,2-TETRACHLOROETHANE	55143	MSLZDRM3M1LR	55143003	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	1,1,2-TRICHLOROETHANE	55143	MSLZDRM1M1LR	55143001	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	1,1,2-TRICHLOROETHANE	55143	MSLZDRM3M1LR	55143003	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	1,1-DICHLOROETHANE	55143	MSLZDRM1M1LR	55143001	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	1,1-DICHLOROETHANE	55143	MSLZDRM3M1LR	55143003	WG	12500	U	12500	R	ug/L	DL

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VOA	SW8260	1,1-DICHLOROETHENE	55143	MSLZDRM1M1LR	55143001	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	1,1-DICHLOROETHENE	55143	MSLZDRM3M1LR	55143003	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	1,2,3-Trichlorobenzene	55143	MSLZDRM1M1LR	55143001	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	1,2,3-Trichlorobenzene	55143	MSLZDRM3M1LR	55143003	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	1,2,4-TRICHLOROBENZENE	55143	MSLZDRM1M1LR	55143001	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	1,2,4-TRICHLOROBENZENE	55143	MSLZDRM3M1LR	55143003	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	1,2-DICHLOROBENZENE	55143	MSLZDRM1M1LR	55143001	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	1,2-DICHLOROBENZENE	55143	MSLZDRM3M1LR	55143003	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	1,2-DICHLOROETHANE	55143	MSLZDRM1M1LR	55143001	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	1,2-DICHLOROETHANE	55143	MSLZDRM3M1LR	55143003	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	1,2-Dichloroethene (total)	55143	MSLZDRM1M1LR	55143001	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	1,2-Dichloroethene (total)	55143	MSLZDRM3M1LR	55143003	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	1,2-DICHLOROPROPANE	55143	MSLZDRM1M1LR	55143001	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	1,2-DICHLOROPROPANE	55143	MSLZDRM3M1LR	55143003	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	1,3-DICHLOROBENZENE	55143	MSLZDRM1M1LR	55143001	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	1,3-DICHLOROBENZENE	55143	MSLZDRM3M1LR	55143003	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	1,4-DICHLOROBENZENE	55143	MSLZDRM1M1LR	55143001	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	1,4-DICHLOROBENZENE	55143	MSLZDRM3M1LR	55143003	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	2-BUTANONE (MEK)	43561	620SB01701	43561003	SO	16	=	16	J	ug/Kg	IC
VOA	SW8260	2-BUTANONE (MEK)	43561	620SB01703	43561004	SO	23.3	=	23.3	J	ug/Kg	IC
VOA	SW8260	2-BUTANONE (MEK)	43561	620SB01801	43561005	SO	12.3	U	12.3	UJ	ug/Kg	IC
VOA	SW8260	2-BUTANONE (MEK)	43561	620SB01803	43561006	SO	19.7	U	19.7	UJ	ug/Kg	IC
VOA	SW8260	2-BUTANONE (MEK)	43561	620CB01801	43561007	SO	14.4	U	14.4	UJ	ug/Kg	IC
VOA	SW8260	2-BUTANONE (MEK)	55143	MSLZDRM1M1LR	55143001	WG	25000	U	25000	R	ug/L	DL
VOA	SW8260	2-BUTANONE (MEK)	55143	MSLZDRM3M1LR	55143003	WG	25000	U	25000	R	ug/L	DL
VOA	SW8260	2-Chloroethyl vinyl ether	43561	620SB01701	43561003	SO	11.6	U	11.6	UJ	ug/Kg	BS,MS
VOA	SW8260	2-Chloroethyl vinyl ether	43561	620SB01703	43561004	SO	19.2	U	19.2	UJ	ug/Kg	BS
VOA	SW8260	2-Chloroethyl vinyl ether	43561	620SB01801	43561005	SO	12.3	U	12.3	UJ	ug/Kg	BS
VOA	SW8260	2-Chloroethyl vinyl ether	43561	620SB01803	43561006	SO	19.7	U	19.7	UJ	ug/Kg	BS
VOA	SW8260	2-Chloroethyl vinyl ether	43561	620CB01801	43561007	SO	14.4	U	14.4	UJ	ug/Kg	BS
VOA	SW8260	2-Chloroethyl vinyl ether	55143	MSLZDRM1M1LR	55143001	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	2-Chloroethyl vinyl ether	55143	MSLZDRM3M1LR	55143003	WG	12500	U	12500	R	ug/L	DL

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VOA	SW8260	2-HEXANONE	55143	MSLZDRM1M1LR	55143001	WG	25000	U	25000	R	ug/L	DL
VOA	SW8260	2-HEXANONE	55143	MSLZDRM3M1LR	55143003	WG	25000	U	25000	R	ug/L	DL
VOA	SW8260	4-METHYL-2-PENTANONE (MIBK)	55143	MSLZDRM1M1LR	55143001	WG	25000	U	25000	R	ug/L	DL
VOA	SW8260	4-METHYL-2-PENTANONE (MIBK)	55143	MSLZDRM3M1LR	55143003	WG	25000	U	25000	R	ug/L	DL
VOA	SW8260	ACETONE	43561	620SB01701	43561003	SO	33.5	=	33.5	J	ug/Kg	IC
VOA	SW8260	ACETONE	43561	620SB01703	43561004	SO	63.4	=	63.4	J	ug/Kg	IC
VOA	SW8260	ACETONE	43561	620SB01801	43561005	SO	14.6	=	14.6	J	ug/Kg	IC
VOA	SW8260	ACETONE	43561	620SB01803	43561006	SO	109	=	109	J	ug/Kg	IC
VOA	SW8260	ACETONE	43561	620CB01801	43561007	SO	17	=	17	J	ug/Kg	IC
VOA	SW8260	ACETONE	55143	MSLZDRM1M1	55143001	WG	406000	E	406000	R	ug/L	LR
VOA	SW8260	ACETONE	55143	MSLZDRM3M1	55143003	WG	622000	E	622000	R	ug/L	LR
VOA	SW8260	BENZENE	55143	MSLZDRM1M1LR	55143001	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	BENZENE	55143	MSLZDRM3M1LR	55143003	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	BROMODICHLOROMETHANE	55143	MSLZDRM1M1LR	55143001	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	BROMODICHLOROMETHANE	55143	MSLZDRM3M1LR	55143003	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	BROMOFORM	55143	MSLZDRM1M1LR	55143001	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	BROMOFORM	55143	MSLZDRM3M1LR	55143003	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	BROMOMETHANE	55143	MSLZDRM1M1LR	55143001	WG	25000	U	25000	R	ug/L	DL
VOA	SW8260	BROMOMETHANE	55143	MSLZDRM3M1LR	55143003	WG	25000	U	25000	R	ug/L	DL
VOA	SW8260	CARBON DISULFIDE	55143	MSLZDRM1M1LR	55143001	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	CARBON DISULFIDE	55143	MSLZDRM3M1LR	55143003	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	CARBON TETRACHLORIDE	55143	MSLZDRM1M1LR	55143001	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	CARBON TETRACHLORIDE	55143	MSLZDRM3M1LR	55143003	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	CHLOROBENZENE	55143	MSLZDRM1M1LR	55143001	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	CHLOROBENZENE	55143	MSLZDRM3M1LR	55143003	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	CHLOROETHANE	55143	MSLZDRM1M1LR	55143001	WG	25000	U	25000	R	ug/L	DL
VOA	SW8260	CHLOROETHANE	55143	MSLZDRM3M1LR	55143003	WG	25000	U	25000	R	ug/L	DL
VOA	SW8260	CHLOROFORM	55143	MSLZDRM1M1LR	55143001	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	CHLOROFORM	55143	MSLZDRM3M1LR	55143003	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	CHLOROMETHANE	55143	MSLZDRM1M1LR	55143001	WG	25000	U	25000	R	ug/L	DL
VOA	SW8260	CHLOROMETHANE	55143	MSLZDRM3M1LR	55143003	WG	25000	U	25000	R	ug/L	DL
VOA	SW8260	cis-1,2-DICHLOROETHYLENE	55143	MSLZDRM1M1LR	55143001	WG	12500	U	12500	R	ug/L	DL

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VOA	SW8260	Chemical Name	55143	MSLZDRM3M1LR	55143003	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	cis-1,2-DICHLOROETHYLENE	55143	MSLZDRM1M1LR	55143001	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	cis-1,3-DICHLOROPROPENE	55143	MSLZDRM3M1LR	55143003	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	DIBROMOCHLOROMETHANE	55143	MSLZDRM1M1LR	55143001	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	DIBROMOCHLOROMETHANE	55143	MSLZDRM3M1LR	55143003	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	ETHYLBENZENE	55143	MSLZDRM1M1LR	55143001	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	ETHYLBENZENE	55143	MSLZDRM3M1LR	55143003	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	m+p Xylene	55143	MSLZDRM1M1LR	55143001	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	m+p Xylene	55143	MSLZDRM3M1LR	55143003	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	METHYLENE CHLORIDE	43561	620SB01701	43561003	SO	1.6	JB	11.6	U	ug/Kg	BL
VOA	SW8260	METHYLENE CHLORIDE	43561	620SB01703	43561004	SO	2.5	JB	19.2	U	ug/Kg	BL
VOA	SW8260	METHYLENE CHLORIDE	43561	620SB01801	43561005	SO	1.6	JB	12.3	U	ug/Kg	BL
VOA	SW8260	METHYLENE CHLORIDE	43561	620SB01803	43561006	SO	2.5	JB	19.7	U	ug/Kg	BL
VOA	SW8260	METHYLENE CHLORIDE	43561	620CB01801	43561007	SO	1.4	JB	14.4	U	ug/Kg	BL
VOA	SW8260	METHYLENE CHLORIDE	55143	MSLZDRM1M1LR	55143001	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	METHYLENE CHLORIDE	55143	MSLZDRM3M1LR	55143003	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	o-Xylene	55143	MSLZDRM1M1LR	55143001	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	o-Xylene	55143	MSLZDRM3M1LR	55143003	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	STYRENE	55143	MSLZDRM1M1LR	55143001	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	STYRENE	55143	MSLZDRM3M1LR	55143003	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	TETRACHLOROETHYLENE(PCE)	55143	MSLZDRM1M1LR	55143001	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	TETRACHLOROETHYLENE(PCE)	55143	MSLZDRM3M1LR	55143003	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	TOLUENE	43561	620SB01701	43561003	SO	0.67	J	5.8	U	ug/Kg	BL
VOA	SW8260	TOLUENE	55143	MSLZDRM1M1LR	55143001	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	TOLUENE	55143	MSLZDRM3M1LR	55143003	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	trans-1,2-DICHLOROETHENE	55143	MSLZDRM1M1LR	55143001	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	trans-1,2-DICHLOROETHENE	55143	MSLZDRM3M1LR	55143003	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	trans-1,3-DICHLOROPROPENE	55143	MSLZDRM1M1LR	55143001	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	trans-1,3-DICHLOROPROPENE	55143	MSLZDRM3M1LR	55143003	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	TRICHLOROETHYLENE (TCE)	55143	MSLZDRM1M1LR	55143001	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	TRICHLOROETHYLENE (TCE)	55143	MSLZDRM3M1LR	55143003	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	Vinyl acetate	55143	MSLZDRM1M1	55143001	WG	1000	U	1000	UJ	ug/L	CC

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VOA	SW8260	Vinyl acetate	55143	MSLZDRM1M1LR	55143001	WG	25000	U	25000	R	ug/L	DL
VOA	SW8260	Vinyl acetate	55143	MSLZDRM2M1	55143002	WG	10	U	10	UJ	ug/L	CC
VOA	SW8260	Vinyl acetate	55143	MSLZDRM3M1	55143003	WG	1000	U	1000	UJ	ug/L	CC
VOA	SW8260	Vinyl acetate	55143	MSLZDRM3M1LR	55143003	WG	25000	U	25000	R	ug/L	DL
VOA	SW8260	VINYL CHLORIDE	55143	MSLZDRM1M1LR	55143001	WG	25000	U	25000	R	ug/L	DL
VOA	SW8260	VINYL CHLORIDE	55143	MSLZDRM3M1LR	55143003	WG	25000	U	25000	R	ug/L	DL
VOA	SW8260	XYLENES, TOTAL	55143	MSLZDRM1M1LR	55143001	WG	12500	U	12500	R	ug/L	DL
VOA	SW8260	XYLENES, TOTAL	55143	MSLZDRM3M1LR	55143003	WG	12500	U	12500	R	ug/L	DL

Chain of Custody/Laboratory Analysis Form

Lab Batch/SDG ID: _____

page 1 of 2

Laboratory: GEL, Charleston, SC		Site Name: Zone F, AOC 620/SWMU 36	
Project Name: Charleston Navy Complex		TAT: 7 day selected PCB, 21 D.PKG	
Project Number: _____		Level: Level 3	
Project Manager: Tom Beisel/ATL		Address: GNV: 3011 SW Williston Rd., Gainesville, FL 32605	
Address: ATL: 115 Perimeter Center Place NE, Suite 700, Atlanta, GA 30346-1278		Send Report To: see 2nd page of COC	
EDD: CNC format			

Sample ID	Station ID	Depth		Date & Time Collected	Matrix	# of co	PCBs (SVOCs (VOCs (Metals	PCBs (SVOCs (VOCs (Metals			Comments
		Begin	End														
620SB01501	F620SB015	0	1	6.6.01/1525	SO		X										435201 001
620SB01601	F620SB016	0	1	6.6.01/1530	SO		X										002
620SB01701	F620SB017	0	1	6.6.01/1215	SO	5	X	X	X	X							7-day PCB 003
620SB01701MS	F620SB017	0	1	6.6.01/1215	SO	5	X	X	X	X							007
620SB01701SD	F620SB017	0	1	6.6.01/1215	SO	5	X	X	X	X							007
620SB01703	F620SB017	2	3	6.6.01/1250	SO	5	X*	X	X	X							See Remark 004
620SB01801	F620SB018	0	1	6.6.01/1330	SO	5	X	X	X	X							7-day PCB 005
620CB01801	F620SB018	0	1	6.6.01/	SO	5	X	X	X	X							009
620SB01803	F620SB018	2	3	6.6.01/1400	SO	5	X*	X	X	X							See Remark 006
620SB01901	F620SB019	0	1	6.6.01/1430	SO	1	X										7-day PCB
620SB01903	F620SB019	2	3	6.6.01/1440	SO	1	X*										See Remark
620SB02001	F620SB020	0	1	6.6.01/1450	SO	1	X										7-day PCB
620SB02003	F620SB020	2	3	6.6.01/1500	SO	1	X*										See Remark
620SB02101	F620SB021	0	1	6.6.01/1505	SO		X										7-day PCB
620SB02103	F620SB021	2	3	6.6.01/1510	SO		X*										See Remark
620EB02101	F620EB021	0	1	6.6.01/1200	SQ	6					X	X	X	X			EB 4352001
620TB02101	F620TB021			Lab PROVIDED	SQ	3							X				TB 002

Sampled By: Darryl Gates / STAN ELLER Date/Time: 6.6.01 / AS ABOVE

Relinquished by: [Signature] Date/Time: 6.6.01 / 1715

Additional Samplers: _____ Date/Time: 6.6.01 / 1720

Relinquished by: _____ Date/Time: _____

Received By: _____ Date/Time: _____

Shipped Via: UPS FedEx Hand Other _____

Remarks: X* - Hold subsurface PCB analyses, contingent upon shallow result. Target Lists on 2nd page

Temperature: 6 °

20C106 (7032 LPC 65)
4352200
4352200
4352200
4352200
4352200
4352200
4352200

CH2M HILL Chain of Custody/ Laboratory Analysis Form

COC Tracking #: ZG620-100201-01 page 1 of 4

Laboratory: GEL		Site Name: Zone F, AOC 620																Lab Batch/SDG:	
Project Name: Charleston Navy Complex		TAT: 1-QTAT-7																50283/50283	
Project Number: 158814.PM.04		Level: Level 3																50286/50283B	
Project Manager: Tom Beisel/ATL		Address: GNV: 3011 SW Williston Rd., Gainesville, FL 32605																50288/50283C	
Address: ATL: 115 Perimeter Center Place NE, Suite 700, Atlanta, GA 30346-1278		Send Report To: see last page of COC		EDD: CNC format														50290/50283D	
Sample ID	Sample Description	Depth		Date & Time Collected	Matrix	# of containers	1 - 4 ounce jar		1 - 16 ounce jar		1 - 500mL HDPE, HNC3								Comments
		Begin	End				Lead (SW6010B)	Mercury (SW7471A)	SPLP Lead * (SW1312/6010B)	SPLP Mercury * (SW1312/7471A)	Lead (SW6010B)	Mercury (SW7470A)							
620SB02201	F620SB022	0	1	10/10/01 / 1040	SO	2	X	X	X	X									Hold SPLP
620SB02203	F620SB022	2	3	10/10/01 / 1045	SO	2	X	X	X	X									Hold SPLP
620SB02301	F620SB023	0	1	10/10/01 / 1050	SO	2	X	X	X	X									Hold SPLP
620CB02301	F620SB023	0	1	10/10/01 / 1050	SO	2	X	X											
620SB02303	F620SB023	2	3	10/10/01 / 1055	SO	2	X		X										Hold SPLP
620SB02401	F620SB024	0	1	10/10/01 / 1100	SO	2	X		X										Hold SPLP
620SB02403	F620SB024	2	3	10/10/01 / 1105	SO	2	X		X										Hold SPLP
620SB02501	F620SB025	0	1	10/10/01 / 1110	SO	2	X		X										Hold SPLP
X 620SB02503	F620SB025	2	3	No Sample	SO	2	X		X										Auger Refusal
620SB02601	F620SB026	0	1	10/10/01 / 1120	SO	2	X		X										Hold SPLP
620SB02601MS	F620SB026	0	1	10/10/01 / 1120	SO	1	X												
620SB02601SD	F620SB026	0	1	10/10/01 / 1120	SO	1	X												
620SB02603	F620SB026	2	3	10/10/01 / 1125	SO	2	X		X										Hold SPLP
620SB02701	F620SB027	0	1	10/10/01 / 1130	SO	2	X		X										Hold SPLP
620SB02703	F620SB027	2	3	10/10/01 / 1135	SO	2	X		X										Hold SPLP
620SB02801	F620SB028	0	1	10/10/01 / 1140	SO	2	X		X										Hold SPLP
620SB02803	F620SB028	2	3	10/10/01 / 1145	SO	2	X		X										Hold SPLP
620SB02901	F620SB029	0	1	10/10/01 / 1150	SO	2	X	X	X	X									Hold SPLP
X 620SB02903	F620SB029	2	3	No Sample	SO	2	X	X	X	X									Auger Refusal
620SB03001	F620SB030	0	1	10/10/01 / 1200	SO	2	X	X	X	X									Hold SPLP
X 620SB03003	F620SB030	2	3	No Sample	SO	2	X	X	X	X									Auger Refusal

Sampled By: Darryl Gates

Date/Time: As Noted

Relinquished by: *Ch. Blay*

Date/Time: 10-11-01/1515

Additional Samplers: Chris Blundy

Received By Lab: *Darrel Gates*

Date/Time: 10/10/01 15:15

Relinquished by:

Date/Time:

Received By:

Date/Time:

Shipped Via: UPS FedEx Hand Other Tracking#:

Remarks: * Hold SPLP -- samples for SPLP will be selected based on soil results

Temperature:

Rec Exceptions:

COC Tracking #: ZG620-100201-01 Page 2 of 4

Sampled By: Darryl Gates		Date/Time: As Noted		Relinquished by: <i>[Signature]</i>		Date/Time: 10/16/01	
Additional Samplers: Chris Blundy							
Received By Lab: <i>Patricia Dower</i>		Date/Time: 10/16/01 15:25		Relinquished by:		Date/Time:	
Received By:		Date/Time:		Shipped Via: UPS FedEx Hand Other Tracking#:			
Remarks: * Hold SPLP -- samples for SPLP will be selected based on soil results				Temperature:			

Receipt Exceptions

CH2M HILL Chain of Custody/ Laboratory Analysis Form

COC Tracking #: ZG620-100201-01 page 3 of 4

Laboratory: GEL		Project Name: Charleston Navy Complex		Site Name: Zone F, AOC 620																Lab Batch/SDG:	
Project Number: 158814.PM.04		TAT: 1-QTAT-7																			
Project Manager: Tom Beisel/ATL		Level: Level 3																			
Address: GNV: 3011 SW Williston Rd., Gainesville, FL 32605																					
ATL: 115 Perimeter Center Place NE, Suite 700, Atlanta, GA 30346-1278																					
Send Report To: see last page of COC		EDD: CNC format																			
Sample ID	Sample Description	Depth		Date & Time		Matrix	# of containers	Lead (SW6010B)	Mercury (SW7471A)	SPLP Lead * (SW1312/6010B)	SPLP Mercury * (SW1312/7471A)	Lead (SW6010B)	Mercury (SW7470A)								Comments
		Begin	End	Collected																	
620SB03903	F620SB039	2	3	10/10/01 / 1425	SO	2	X		X												Hold SPLP
620SB04001	F620SB040	0	1	10/10/01 / 1430	SO	2	X		X												Hold SPLP
620SB04003	F620SB040	2	3	10/10/01 / 1435	SO	2	X		X												Hold SPLP
620SB04101	F620SB041	0	1	10/10/01 / 1440	SO	2	X		X												Hold SPLP
620SB04103	F620SB041	2	3	10/10/01 / 1445	SO	2	X		X												Hold SPLP
620SB04201	F620SB042	0	1	10/10/01 / 1450	SO	2	X		X												Hold SPLP
620SB04203	F620SB042	2	3	10/10/01 / 1455	SO	2	X		X												Hold SPLP
620SB04301	F620SB043	0	1	10/10/01 / 1500	SO	2	X		X												Hold SPLP
620SB04303	F620SB043	2	3	10/10/01 / 1505	SO	2	X		X												Hold SPLP
620SB04401	F620SB044	0	1	10/10/01 / 1510	SO	2	X		X												Hold SPLP
620SB04403	F620SB044	2	3	10/10/01 / 1515	SO	2	X		X												Hold SPLP
620SB04501	F620SB045	0	1	10/10/01 / 1520	SO	2	X		X												Hold SPLP
620SB04503	F620SB045	2	3	10/10/01 / 1525	SO	2	X		X												Hold SPLP
620SB04601	F620SB046	0	1	10/10/01 / 1535	SO	2	X		X												Hold SPLP
620SB04603	F620SB046	2	3	10/10/01 / 1540	SO	2	X		X												Hold SPLP
620CB04603	F620SB046	2	3	10/10/01 / 1540	SO	1	X														
620EB022L1	F620EB022			10/10/01 / 1600	SQ							X	X								EB
620EB023L1	F620EB023				SQ							X	X								EB
620GW002L1	F620GW002			10/11/01 / 1030	WG							X	X								
620GW004L1	F620GW004			10/11/01 / 1125	WG							X									
620EW002L1	F620EW002			10/11/01 / 1035	WQ							X	X								EB

Sampled By: Darryl Gates

Date/Time: As Noted

Relinquished by: *Chi-Bl-7*

Date/Time: 10-11-01/1515

Additional Samplers: Chris Blundy

Received By Lab: *Patricia Dover*

Date/Time: 10/11/01 1315

Relinquished by:

Date/Time:

Received By:

Date/Time:

Shipped Via: UPS FedEx Hand Other Tracking#:

Remarks: * Hold SPLP -- samples for SPLP will be selected based on soil results

Temperature:

Reception: *Reception*

COC Tracking #: ZF620-112001-01 Page 1 of 2

Sampled By: Darryl Gates <u>Chris Blundy</u>	Date/Time: As Noted <u>11-26-01</u>	Relinquished by: <u>Chris Blundy</u>	Date/Time: <u>11-26-01/1610</u>
Additional Samplers: Chris Blundy <u>Sean Smith</u>			
Received By Lab: <u>Mike Kousko</u>	Date/Time: <u>11-26-01 1610</u>	Relinquished by:	Date/Time:
Received By:	Date/Time:	Shipped Via: UPS FedEx Hand Other	Tracking#:
Remarks:			Temperature:

Receipt Exceptions:

CH2M HILL Chain of Custody/ Laboratory Analysis Form

COC Tracking #: ZZMSL-012402-01 page 1 of 2

Laboratory: GEL		Site Name: IDW - Multiple Sites		3 - 5 gram Encores		1 - 4 ounce jar		1 - 4ounce jar		3 - 40mL vial, HCl		2 - 1L amber		1 - 500mL HDPE, HNO3		Lab Batch/SDG:		
Project Name: Charleston Navy Complex		TAT: Standard		VOCs (SW8260B)		SVOCs (SW8270C)		% Moisture		RCRA Metals		VOCs (SW8260C)		SVOCs (SW8270C)		Mercury		
Project Number: 158814.PM.04		QA Level: level 3		Lead		RCRA Metals		VOCs (SW8260C)		SVOCs (SW8270C)		Mercury		Lead		RCRA Metals		
Project Manager: Tom Beisel		Address: GNV: 3011 SW Williston Rd., Gainesville, FL 32605		Send Report To: see last page of COC		EDD: CNC format												
Address: ATL: 115 Perimeter Center Place NE, Suite 700, Atlanta, GA 30346-1278																		
Sample ID	Station ID	Sample Description	Depth Begin	Depth End	Date & Time Collected	Matrix	# of containers	VOCs (SW8260B)	SVOCs (SW8270C)	% Moisture	Lead	RCRA Metals	VOCs (SW8260C)	SVOCs (SW8270C)	Mercury	Lead	RCRA Metals	
MSLZDRM1M1	ZMSLZDRM1	multiple water drum 1			1/24/2002 1400	WG	6						X	X			X	1 W0105
MSLZDRM2M1	ZMSLZDRM2	multiple water drum 2			1/24/2002-1405	WG	6						X	X			X	2 W0106
MSLZDRM3M1	ZMSLZDRM3	multiple water drum 3			1/24/2002 1410	WG	6						X	X			X	3 W0213
620ZDRM1M1	F620ZDRM1	620 water drum 1			1/24/2002 1425	WG	1								X	X		4 W0140
642ZDRM1M1	F642ZDRM1	642 water drum 1			1/24/2002 1435	WG	1									X		5 W0144
196VDRM1M1	H196VDRM1	196 soil drum 1			1/24/2002 1445	SO	4	X		X								SO147
196VDRM2M1	H196VDRM2	196 soil drum 2			1/24/2002 1450	SO	4	X		X								SO175
196VDRM3M1	H196VDRM3	196 soil drum 3			1/24/2002 1455	SO	4	X		X								SO169
196ZDRM1M1	H196ZDRM1	196 water drum 1			1/24/2002 1600	WG	3						X					6 W0186
005VDRM1M1	E005VDRM1	5 soil drum 1			1/24/2002 1605	SO	1					X						SO192
005VDRM2M1	E005VDRM2	5 soil drum 2			1/24/2002 1609	SO	1					X						SO193
005VDRM3M1	E005VDRM3	5 soil drum 3			1/24/2002 1620	SO	1					X						SO194
005VDRM4M1	E005VDRM4	5 soil drum 4			1/24/2002 1625	SO	1					X						SO195
																		RCRA Disposal
																		Site Complete

Sampled By: Chris Blumley Date/Time: _____
 Additional Samplers: Andrew O'Donohue / C. D. Lee
 Received By Lab: Mike Beisel Date/Time: 1-24-02 1620
 Received By: _____ Date/Time: _____

Relinquished by: Andrew O'Donohue Date/Time: 1-24-02/1620

Relinquished by: _____ Date/Time: _____
 Shipped Via: UPS FedEx Hand Other Tracking#: _____

Remarks: _____

Temperature: _____

Receipt Exceptions: _____

Sampled By <u>Chris Blundy</u>	Date/Time <u>2-7-02</u>	Relinquished by: _____	Date/Time _____
Additional Samplers: <u>Andrew O'Connor</u>			
Received By Lab. <u>Julie Robinson / MK</u>	Date/Time <u>2/7/02 1600</u>	Relinquished by: _____	Date/Time _____
Received By: _____	Date/Time _____	Shipped Via: UPS <u>FedEx</u> <u>Hand</u> Other Tracking#: _____	
Remarks: _____		Temperature: <u>46</u>	
Receipt Exceptions: _____			

CH2M HILL Chain of Custody/ Laboratory Analysis Form

COC Tracking #: ZF620-021302-01 page 1 of 2

[illegible]

Sampled By: Chris Blundell Date/Time: _____

Relinquished by: [Signature] Date/Time 3-7-02/18

Additional Samplers:

Relinquished by: _____ Date/Time: _____

Received By: _____ Date/Time _____

Shipped Via: UPS FedEx Hand Other Tracking#:

[illegible]

Receipt Exceptions:

(52-41646)

CHAM HILL Chain of Custody/ Laboratory Analysis Form

COC Tracking #: ZF620-112002-01

Page 1 of 2

Laboratory: STL		Site Name: Zone F, AOC 620		<div style="text-align: center; font-size: 2em; font-weight: bold;">RUSH!</div>		1 - 4 ounce jar		1 - 500mL HDPE, HNO3														Lab Batch/SDG:	
Project Name: Charleston Navy Complex						Project Number: 158814.PM.04				TAT: ASAP - Rush #530													
Project Manager: Tom Beisel						QA Level: level 3																	
Address: GNV: 3011 SW Williston Rd., Gainesville, FL 32605						Address: ATL: 115 Perimeter Center Place NE, Suite 700, Atlanta, GA 30346-1278																	
Send Report To: see last page of COC						EDD: CNC format																	
Sample ID	Station ID	Sample Description	Depth		Date & Time Collected	Matrix	# of containers	Lead (SW6010B)	pH	Lead (SW6010B)												Comments	
620SB068	F620SB068		0	1	11/22/02 1330	SO		X														S.W.	
620SB069	F620SB069		0	1	11/22/02 1340	SO		X														S.E.	
620SB070	F620SB070		0	1	11/22/02 1350	SO		X														N.W.	
620SB071	F620SB071		0	1	11/22/02 1400	SO		X														N.E.	
620CB071	F620SB071		0	1	11/22/02 1400	SO		X														N.E.	
620EB068M3	F620SB068				11/22/02 1450	SO				X												EB	

Sampled By: <u>[Signature]</u>	Date/Time: <u>11/22/02 1400</u>	Relinquished by: <u>[Signature]</u>	Date/Time: <u>11/22/02 1500</u>
Additional Samplers: <u>11/22</u>			
Received By Lab: <u>[Signature]</u>	Date/Time: <u>11/23</u>	Relinquished by:	Date/Time:
Received By:	Date/Time:	Shipped Via: UPS FedEx Hand Other Tracking#:	Temperature: <u>3.9</u>
Remarks: Rush #530		<u>5848528</u>	
Receipt Exceptions:			

CH2M HILL Chain of Custody/ Laboratory Analysis Form

COC Tracking #: ZF620-120102-01 page 1 of 2

Laboratory: GEL		Project Name: Charleston Navy Complex		Site Name: Zone F, AOC 620	
Project Number: 158814.PM.04		TAT: ASAP - Rush #548			
Project Manager: Tom Beisel		QA Level: level 3			
Address: GNV: 3011 SW Williston Rd., Gainesville, FL 32605					
ATL: 115 Perimeter Center Place NE, Suite 700, Atlanta, GA 30346-1278					
Send Report To: see last page of COC				EDD: CNC format	
Sample ID	Station ID	Sample Description	Depth Begin End	Date & Time Collected	Matrix
620SB072	F620SB072		0 1	12/2/02 1010	SO
620SB073	F620SB073				SO
620EB068M4	F620SB072			12/2/02 1030	SQ
# of containers					
Lead (SW6010B)	pH	Lead (SW6010B)			
X					
X		Not Used			
		X			
Lab Batch/SDG: 71442%, 71384%					
Comments					
EB					

Sampled By: [Signature] Date/Time: 12/2/02 1010 Relinquished by: [Signature] Date/Time: 12/2/02 1850
 Additional Samplers: _____
 Received By Lab: [Signature] Date/Time: 12/02/02 1550 Relinquished by: _____ Date/Time: _____
 Received By: _____ Date/Time: _____ Shipped Via: UPS FedEx Hand Other Tracking#: _____
 Remarks: Rush #548 Temperature: _____
 Receipt Exceptions: _____

CH2M HILL Chain of Custody/ Laboratory Analysis Form

COC Tracking #: ZF620-010603-01 Page 1 of 2

Laboratory: GEL		Project Name: Charleston Navy Complex		Site Name: Zone F, AOC 620	
Project Number: 158814.PM.04		TAT: 7 days or less			
Project Manager: Tom Beisel		QA Level: level 3			
Address: GNV: 3011 SW Williston Rd., Gainesville, FL 32605					
ATL: 115 Perimeter Center Place NE, Suite 700, Atlanta, GA 30346-1278					
Send Report To: see last page of COC		EDD: CNC format			

Sample ID	Station ID	Sample Description	Depth		Date & Time Collected	Matrix	# of containers	1 - 4 ounce jar	1 - 500mL HDPE, HNO3	1 - 16 ounce jar							Comments
			Begin	End				Lead (SW6010B)	pH	Lead (SW6010B)	TCLP Lead (1311/6010B)						
620SB07301	F620SB073	Soil	0	1	1-8-03 / 1340	SO	1	X		X							NO TELP collected
620SB07303	F620SB073		1	2	1-8-03 / 1345	SO	1	X									
620SB07401	F620SB074		0	1	1-8-03 / 1355	SO	1	X									RLRA
620SB07403	F620SB074		1	2	1-8-03 / 1400	SO	1	X									
620CB07403	F620SB074		1	2	1-8-03 / 1400	SO	1	X									samples complete
620SB07501	F620SB075		0	1	1-8-03 / 1410	SO	1	X									
620SB07503	F620SB075		1	2	1-8-03 / 1415	SO	1	X									
620SB07601	F620SB076		0	1	1-8-03 / 1425	SO	1	X									
620SB07603	F620SB076		1	2	1-8-03 / 1430	SO	1	X									
620EB073N1	F620EB073	73062%			1-8-03 / 1440	SQ	1			X							EB

Sampled By: AD'Conner Date/Time: 1-8-03 / AS NOTED

Relinquished by: ANDREW OLIVER Date/Time: 1-8-02 / 1545

Additional Samplers:

Received By Lab: Mike Sanchez Date/Time: 1-8-03 1545

Relinquished by: Date/Time:

Received By: Date/Time:

Shipped Via: UPS FedEx Hand Other Tracking#:

Remarks: NO TELP sample collected

Temperature: 50

Receipt Exceptions:

PHASE II INTERIM MEASURE WORK PLAN

Soil Removal at Building 68

AOC 620/SWMU 36, Zone F



***Charleston Naval Complex
North Charleston, South Carolina***

SUBMITTED TO
***U.S. Navy Southern Division
Naval Facilities Engineering Command***

PREPARED BY
CH2M-Jones

December 2001

Revision 0
Contract N62467-99-C-0960
158814.ZF.PR.07

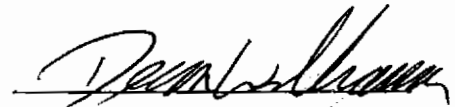
**Certification Page for Phase II Interim Measure Work Plan
(Revision 0) — AOC 620/SWMU 36, Zone F**

Soil Removal at Building 68

I, Dean Williamson, certify that this report has been prepared under my direct supervision. The data and information are, to the best of my knowledge, accurate and correct, and the report has been prepared in accordance with current standards of practice for engineering.

South Carolina

P.E. No. 21428



Dean Williamson, P.E.


Date

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1 Acronyms and Abbreviations

2	ALM	Adult Lead Methodology
3	AOC	area of concern
4	BCT	BRAC Cleanup Team
5	BRC	background reference concentration
6	CNC	Charleston Naval Complex
7	COC	chemical of concern
8	DAF	dilution attenuation factor
9	EPA	U.S. Environmental Protection Agency
10	ft bls	feet below land surface
11	IM	interim measure
12	L/kg	liters per kilogram
13	MCL	maximum contaminant level
14	MCS	media cleanup standard
15	µg/L	micrograms per liter
16	mg/kg	milligrams per kilogram
17	mg/L	milligrams per liter
18	PPE	personal protective equipment
19	RBC	risk-based concentration
20	SB	subsurface (soil)
21	SPLP	synthetic precipitation leaching procedure
22	SS	surface (soil)
23	SSL	soil screening level
24	SWMU	solid waste management unit
25	TCLP	toxicity characteristic leachate procedure
26	TSDF	treatment, storage, and disposal facility

1.0 Introduction

1.1 Purpose of the Phase II Interim Measure Work Plan

An Interim Measure (IM) is proposed to remove soils contaminated with lead at Area of Concern (AOC) 620 and Solid Waste Management Unit (SWMU) 36 in Zone F of the Charleston Naval Complex (CNC). The IM will be conducted in the following three phases:

- Phase I —Pre-excavation sampling
- Phase II —Soil removal
- Phase III — Additional soil removal following demolition of Building 68

The Phase I pre-excavation sampling at AOC 620 has been conducted in accordance with the *Phase I Interim Measure Work Plan; Pre-Excavation Sampling and Analysis Plan; AOC 620/SWMU 36, Zone F* (CH2M-Jones, September 2001). The Phase II IM involves excavating and removing soils as needed within the accessible areas of AOC 620, before demolition of Building 68. Phase III of the IM will involve excavation under Building 68 in an area that is not readily accessible, and will occur after building demolition (by other contractors). The Phase III soil removal area will be determined after collecting additional pre-excavation samples, and will be presented in the Phase III IM Work Plan.

This Work Plan for the Phase II IM presents the following:

- The results of the Phase I pre-excavation sampling
- The media cleanup standards (MCSs) for AOC 620
- Target soil excavation areas
- Excavation and stockpiling details
- Waste disposal practices to be used for the soils
- The proposed content of the IM Completion Report

This IM will address the removal of surface and near-surface (above the water table) soils that exceed the appropriate surface and subsurface soil MCSs for lead. Because mercury was also detected at levels higher than the generic soil screening level (SSL) in some samples where lead contamination was identified, this Work Plan will also address whether remediation of mercury-containing soils is necessary as part of the IM.

1.2 AOC 620/SWMU 36 Background

AOC 620/SWMU 36 is located in the industrial area of Zone F, east of Hobson Avenue. The area is zoned for heavy industrial use. AOC 620 is the site of Building 68, the former Battery Shop. SWMU 36 is located within the Acid Tank room in the south central portion of the building and is the site of sulfuric acid releases. Because SWMU 36 is a small part of AOC 620, the site will be referred to only as AOC 620.

On two occasions, the floor drain to the waste acid holding tank south of Building 68 separated from the floor allowing approximately 1,025 gallons of sulfuric acid to discharge to the soil below the Acid Tank Room. Following each spill, a sodium carbonate solution was used to neutralize the soil below the building.

Two areas at AOC 620 where lead has been identified at elevated concentrations in soil are:

- Near two wash basins along the eastern wall in the northeast portion of the building, and the drain line from these basins that extended parallel to the building beneath the eastern loading dock, designated the Wash Basin Area.
- Beneath the acid tank room area, including the exterior area south of the building, which is designated the Acid Tank Area.

Additional details of the regulatory background and description of AOC 620 are described in the *Phase I Interim Measure Work Plan* (CH2M-Jones, September 2001) and *Zone F RFI Report, Revision 0* (EnSafe Inc. [EnSafe], 1997).

1.3 Organization of the Phase II IM Work Plan

This Phase II IM Work Plan consists of the following sections, including this introductory section.

1.0 Introduction — Presents the purpose of the Work Plan and background information regarding the site.

2.0 Results of Phase I Interim Measure – Presents the results of the Phase I IM Pre-excavation sampling.

3.0 Identification of Media Cleanup Standards – Identifies and presents the derivation of the MCSs for lead and mercury at AOC 620.

- 1 **4.0 Technical Approach for the Interim Measure**— Provides a brief description of the
- 2 technical approach for the IM soil removal, including identification of the proposed
- 3 excavation area and procedures for waste management.
- 4 **5.0 Interim Measure Completion Report** — Describes the proposed contents of the IM
- 5 Completion Report.
- 6 **6.0 References** — Lists the references used in this document.
- 7 **Appendix A** presents calculations for partitioning coefficient and SSL values for lead and
- 8 mercury.
- 9 **Appendix B** presents supporting parameters for calculating Dilution Attenuation Factor
- 10 (DAF).
- 11 All tables and figures are presented at the end of their respective sections.

Section 2.0

2.0 Results of Phase I Interim Measure

This section presents the results of the Phase I IM pre-excavation sampling. Both soil and groundwater samples were collected during the Phase I IM at AOC 620. Details regarding the purpose of the Phase I samples are provided in the *Phase I IM Work Plan, AOC 620/SWMU 36, Zone F, Revision 0* (CH2M-Jones, 2001). Samples were analyzed for lead and mercury in soil and synthetic precipitation leaching procedure (SPLP) leachate, for pH and toxicity characteristic leachate procedure (TCLP) lead in soil, and for lead and mercury in groundwater. Soil sample results are compared to background values in this section, and will be compared to appropriate risk-based and SSL values in Section 4.0 of this IM Work Plan.

2.1 Phase I Interim Measure Pre-excavation Soil Sampling

The Phase I IM involved collecting surface and subsurface soil samples to further delineate the extent of soils exceeding the MCS. For the Phase I sampling effort, the extent of soils with lead concentrations higher than 1,000 milligrams per kilogram (mg/kg) (the industrial land use screening value) was delineated in the Wash Basin Area. Pre-excavation sampling in the Acid Tank Area was started and may be completed after building demolition, which will allow better access to the soil beneath the building and allow for more detailed lead delineation.

Figure 2-1 presents the locations of samples collected in the Wash Basin Area, and Figure 2-2 presents the locations of samples collected in the Acid Tank Area. Soil samples previously collected by EnSafe and CH2M-Jones for the AOC 620 RFI are also shown on the figures.

Thirty-two surface soil [0 to 1 ft below land surface (ft bls)] and 29 subsurface soil (2 to 3 ft bls) samples were collected for the Phase I IM at AOC 620. Subsurface soil samples were collected at 2 to 3 ft bls because historic water level measurements indicated that the groundwater table in the AOC 620 area is approximately 4 ft bls. Soil borings 620SB022 through 620SB035 and 620SB053 through 620SB057 were collected in the Wash Basin Area, and soil borings 620SB036 through 620SB046 and 620SB058 through 620SB060 were collected in the Acid Tank Area. Subsurface obstructions were encountered adjacent to the loading dock in the Wash Basin Area, therefore, subsurface soil samples were not collected at locations 620SB029, 620SB030, or 620SB031. Soil samples designated 620SB058 and 620SB059 were collected at previous sample locations 620SB036 through 620SB038 for waste disposal

evaluation. Soil samples from locations designated 620SB054 and 620SB057, each composited from two aliquots, were also collected for waste disposal evaluation.

All soil samples were analyzed for lead, except for 620SB058 and 620SB059, which were analyzed for pH and TCLP lead. Composite samples 620SB054 and 620SB057 were also analyzed for pH and TCLP lead. Fourteen samples were analyzed for SPLP lead, in order to establish a site-specific partitioning coefficient for lead. The SPLP samples were selected to be representative of both the Acid Tank Area and the Wash Basin Area, and of both surface and subsurface soil. These samples represent a range of total lead concentrations from 3 to 3,900 mg/kg. In addition, surface and subsurface soil samples at six locations in the Wash Basin Area were analyzed for mercury, with three SPLP mercury tests.

Table 2-1 lists the results of analyses on Phase I IM surface and subsurface soil. The following subsections discuss the analytical results.

2.1.1 Soil Lead in the Wash Basin Area

Wash Basin Area - Inside Building 68

Sample locations 620SB022 through 620SB028 were collected inside Building 68, beneath and surrounding the wash basins. Figure 2-3 shows lead concentrations for both surface soil and subsurface soil, labeled (SS) and (SB) on the figure. Lead concentrations in both surface and subsurface soil were generally within background levels for Zones F and G soils, with one subsurface soil measurement of 157 mg/kg at 620SB022, beneath the wash basin, and the rest of the measurements ranging from 3 to 25 mg/kg. The background range for surface soil in combined Zones F and G is 3.5 to 275 mg/kg, and the range for subsurface soil is 2.4 to 123 mg/kg.

Wash Basin Area - Outside Building 68 and Outside of the Loading Dock

Borings 620SB029, 620SB030, 620SB031, 620SB055, and 620SB056 were sampled for lead in soil beneath the pavement; obstructions prevented collection of subsurface soil samples at the first three locations listed. With the exception of sample location 620SB030, where lead was measured at 476 mg/kg, all samples located outside of the loading dock had lead concentrations within or below the range of background concentrations, as shown on Figure 2-3.

Wash Basin Area - Beneath the Loading Dock

Beneath the loading dock, borings 620SB032 through 620SB035, 620SB053, and composite samples 620SB054 and 620SB057 were sampled for lead in surface and subsurface soil. Lead

1 was detected at concentrations ranging from 98 mg/kg to 1800 mg/kg in the Phase I IM
2 samples, as shown in Figure 2-3. Lead had previously been detected in soil beneath the
3 loading dock as high as 18,400 mg/kg in surface soil, at 620SB018.

4 The southernmost IM sample location beneath the loading dock, 620SB035, had lead
5 concentrations of 770 mg/kg in the surface soil and 303 mg/kg in subsurface soil, below the
6 Phase I delineation value of 1,000 mg/kg. The northernmost IM sample location beneath the
7 loading dock, 620SB053, had lead concentrations below the background range, and may be
8 considered outside of the area impacted by a release from the battery operations and wash
9 basin drain line. "Area A," shown on Figure 2-3, has been identified in the Wash Basin Area
10 as the location with lead concentrations in surface and subsurface soil greater than 1,000
11 mg/kg.

12 **2.1.2 Soil Mercury in the Wash Basin Area**

13 Previous RFI samples collected in the loading dock area revealed mercury beneath the
14 loading dock at concentrations ranging from 3.78 to 5.08 mg/kg in both surface and
15 subsurface soils. These levels are higher than Zones F and G background concentrations
16 (0.06 to 2.0 mg/kg in surface soil and 0.04 to 0.57 in subsurface soil). The soil concentrations
17 also exceeded the generic SSL of 1.0 mg/kg for DAF=10.

18 Phase I IM samples were collected in the Wash Basin Area at locations 620SB022, 620SB023,
19 620SB039, 620SB030, 620SB034, and 620SB053, as shown on Figure 2-4. As shown in Table 2-
20 1 and Figure 2-4, the concentrations of the Phase I IM surface soil samples ranged from 0.031
21 to 1.68 mg/kg, all within the background range of samples. The subsurface soil sample from
22 620SB053 had mercury at 1.52 mg/kg, greater than the background range.

23 **2.1.3 Soil Lead in Acid Tank Room Area**

24 **Acid Tank Area - Beneath Building 68**

25 Figure 2-5 shows lead concentrations in the Acid Tank Room area of AOC 620. For the Phase
26 I IM, surface soil and subsurface soil were collected from locations 620SB036, 620SB037, and
27 620SB038 beneath the Acid Tank room. As seen in Figure 2-5 and Table 2-1, these soil
28 samples had lead concentrations ranging from 497 to 3880 mg/kg, all exceeding the range of
29 background concentrations. Additional delineation is planned beneath Building 68 in the
30 Acid Tank Room Area.

31 The Phase I IM samples collected west of the Acid Tank Room contained lead
32 concentrations ranging from 57.5 to 242 mg/kg, similar to background values.

Acid Tank Area - Outside of Building 68

Phase I IM samples 620SB042 through 620SB046 and 620SB060, including both surface and subsurface soil, were collected outside of Building 68 in the general vicinity of the acid UST and piping. Surface and subsurface soil samples were also collected from location 620SB041, adjacent to the previous RFI sample 620SB004. Lead concentrations in the samples collected outside of the building ranged from 2.81 mg/kg to 736 mg/kg.

2.1.4 SPLP Results - Lead

SPLP tests were conducted on selected samples representative of the Wash Basin and Acid Tank Areas, and representative of both surface soil and subsurface soil having a range of lead concentrations. Lead concentrations in the SPLP leachate are presented in Table 2-1. Leachate concentrations ranged from non-detect (< 17.2 micrograms per liter [µg/L]) to 2,740 µg/L.

2.1.5 SPLP Results - Mercury

SPLP tests were conducted on three soil samples from the Wash Basin Area to derive a site-specific SSL for the area. As presented on Table 2-1, samples from 620SB030 (surface soil) and 620SB034 (both surface and subsurface soil) were analyzed by the SPLP. Mercury was not detected (< 0.73 µg/L) in the leachate from the surface soil samples, but was detected in the leachate from the subsurface soil sample at an estimated concentration of 4.22 µg/L.

2.1.6 TCLP Lead and pH Results

Lead was tested in the leachate created by the TCLP on four samples from Area A and two samples from the Acid Tank Area. Some of the samples were composites, as shown on Figures 2-1 and 2-2.

Wash Basin Area

Surface soil was composited from two locations in the northern half of Area A to form surface sample 620SB054. Subsurface soil was composited from the same two locations to form the subsurface sample 620SB054. The surface sample contained lead at 31.2 milligrams per liter (mg/L) in the leachate; the subsurface sample had lead at 0.743 mg/L in the leachate. The samples had pH of 5.80 and 6.18 in the surface soil and the subsurface soil, respectively.

Two locations within the southern half of Area A were combined to form surface and subsurface samples 620SB057. The surface soil sample contained lead at 0.273 mg/L in the

leachate, and the subsurface soil sample contained lead at 0.084 J mg/L. The samples had pH of 6.95 and 6.57 in the surface soil and the subsurface soil, respectively.

Acid Tank Area

Subsurface soil was composited from sample locations 620SB036 and 620SB038 to form sample 620SB058. This sample contained lead in the leachate at 1.98 mg/L; the soil had a pH of 5.06. Surface soil from sample location 620SB037 was re-sampled to form 620SB059; no lead was detected in the TCLP leachate; the soil had a pH of 4.85.

2.2 Phase I IM Pre-excavation Groundwater Sampling

Phase I IM groundwater samples were collected at monitoring well F620GW002, located approximately 30 ft downgradient from the wash basins, and from F620GW004, located 7 ft outside of the Acid Tank room at the location where lead was detected in soil at 4250 mg/kg during the RFI sampling. These wells are shown on Figure 2-7. The sample from F620GW002 was analyzed for lead and mercury; neither of the analytes was detected. The sample from F620GW004 was analyzed for lead; it was detected at an estimated (J) concentration of 3.56 $\mu\text{g/L}$, compared to the Zone G background reference concentration (BRC) of 4.6 $\mu\text{g/L}$. The Zone G BRC is used for comparison because BRC data for Zone F shallow groundwater is based on only one well and lead was not detected in it. The Zone G boundary is located approximately 30 ft south of Building 68, and Zone G is also composed of land use similar to Zone F.

Fig 2-7 presents all RFI lead data from the monitoring wells surrounding AOC 620. As seen in the figure, lead has been detected only in the wells along the south side of the building. Except for the 4/30/97 sample from 620GW004, the detected concentrations have been less than the BRC of 4.6 $\mu\text{g/L}$ and less than the assumed maximum contaminant level (MCL) of 15 $\mu\text{g/L}$. The lead concentration at 620GW004, located adjacent to the Acid Tank Room, was initially measured at 30.7 $\mu\text{g/L}$ in 1997, but the subsequent four sampling events have all resulted in concentrations less than background values, as mentioned above.

TABLE 2-1
 Phase I IM Soil Sampling Results
 Phase II IM Work Plan, AOC 620/SWMU 36, Zone F, Charleston Naval Complex

Parameter	Boring	Soil Sample Type	Soil Concentration mg/kg		SPLP Leachate µg/L	TCLP Leachate µg/L	pH	Background Range mg/kg	Boring Location
Lead	F620SB022	Surface	25.4	=				3.5 - 275	Wash Basin Area, Inside Building
		Subsurface	157	=				2.4 - 123	
	F620SB023	Surface	5.91	=				3.5 - 275	
		Subsurface	13.3	=				2.4 - 123	
	F620SB024	Surface	4.03	=				3.5 - 275	
		Subsurface	3.1	=				2.4 - 123	
	F620SB025	Surface	5.82	=				3.5 - 275	
	F620SB026	Surface	4.92	=				3.5 - 275	
		Subsurface	5.56	=				2.4 - 123	
	F620SB027	Surface	5.17	=				3.5 - 275	
		Subsurface	7.9	=				2.4 - 123	
	F620SB028	Surface	4.67	=				3.5 - 275	
		Subsurface	6.21	=				2.4 - 123	
	F620SB029	Surface	71.6	=				3.5 - 275	
	F620SB030	Surface	476	=				3.5 - 275	Wash Basin Area, Outside Loading Dock
	F620SB031	Surface	273	=				3.5 - 275	
	F620SB055	Surface	3.05	=	24.8	J		3.5 - 275	
		Subsurface	63.1	=	28.4	J		2.4 - 123	
	F620SB056	Surface	2.67	=	17.2	U		3.5 - 275	
		Subsurface	2.66	=	17.2	U		2.4 - 123	

TABLE 2-1
 Phase I IM Soil Sampling Results
 Phase II IM Work Plan, AOC 620/SWMU 36, Zone F, Charleston Naval Complex

Parameter	Boring	Soil Sample Type	Soil Concentration mg/kg		SPLP Leachate µg/L		TCLP Leachate µg/L		pH	Background Range mg/kg	Boring Location
Lead	F620SB032	Surface	1,500	=	1730	=				3.5 - 275	Wash Basin Area,
	F620SB032	Subsurface	1,120	=						2.4 - 123	Beneath Loading Dock
	F620SB033	Surface	430	=						3.5 - 275	(Area A)
		Subsurface	416	=	1,590	=				2.4 - 123	
	F620SB034	Surface	106	=						3.5 - 275	
		Subsurface	1,100	=	2,740	=				2.4 - 123	
	F620SB054	Surface	1,820	=			31,200	=	5.80	3.5 - 275	
	(Composite)	Subsurface	961	=			743	=	6.18	2.4 - 123	
	F620SB057	Surface	790	=			273	=	6.95	3.5 - 275	
	(Composite)	Subsurface	317	=			84	J	6.57	2.4 - 123	
	F620SB035	Surface	770	=	40.4	J				3.5 - 275	Wash Basin Area,
		Subsurface	303	=						2.4 - 123	Beneath Loading Dock,
	F620SB053	Surface	153	=	33.4	J				3.5 - 275	Outside of Area A
		Subsurface	97.8	=	26.8	J				2.4 - 123	
	F620SB036	Surface	570	=						3.5 - 275	Acid Tank Area,
		Subsurface	3,880	=	17.2	U				2.4 - 123	Beneath Building
F620SB037	Surface		2,350	=						3.5 - 275	
	Subsurface		497	=	17.2	U				2.4 - 123	
F620SB038	Surface		952	=						3.5 - 275	
	Subsurface		3,270	=	138	J				2.4 - 123	
F620SB039	Surface		145	=						3.5 - 275	
	Subsurface		242	=						2.4 - 123	

TABLE 2-1

Phase I IM Soil Sampling Results

Phase II IM Work Plan, AOC 620/SWMU 36, Zone F, Charleston Naval Complex

Parameter	Boring	Soil Sample Type	Soil Concentration mg/kg		SPLP Leachate µg/L	TCLP Leachate µg/L	pH	Background Range mg/kg	Boring Location
Lead	F620SB040	Surface	93.5	=				3.5 - 275	
		Subsurface	57.5	=				2.4 - 123	
	F620SB058 (Composite)	Subsurface				1,980	=	5.06	
	F620SB059	Surface				17.2	U	4.85	
	F620SB041	Surface	736	=				3.5 - 275	Acid Tank Area, Outside Building adjacent to
		Subsurface	94.8	=				2.4 - 123	
	F620SB042	Surface	2.81	=				3.5 - 275	Acid Tank Room
		Subsurface	295	=				2.4 - 123	
	F620SB043	Surface	632	=	61.1	J		3.5 - 275	
		Subsurface	736	=				2.4 - 123	
	F620SB044	Surface	224	=				3.5 - 275	
		Subsurface	376	=				2.4 - 123	
	F620SB045	Surface	239	=				3.5 - 275	
		Subsurface	159	=				2.4 - 123	
	F620SB046	Surface	195	=				3.5 - 275	
		Subsurface	137	=				2.4 - 123	
	F620SB060	Surface	406	=				3.5 - 275	
		Subsurface	40.7	=				2.4 - 123	

TABLE 2-1

Phase I IM Soil Sampling Results

Phase II IM Work Plan, AOC 620/SWMU 36, Zone F, Charleston Naval Complex

Parameter	Boring	Soil Sample Type	Soil Concentration mg/kg		SPLP Leachate µg/L	TCLP Leachate µg/L	pH	Background Range mg/kg	Boring Location
Mercury	F620SB022	Surface	0.0659	J				0.06 - 2.0	Wash Basin Area,
		Subsurface	0.101	=				0.04 - 0.57	Inside Building
	F620SB023	Surface	0.031	J				0.06 - 2.0	
	F620SB029	Surface	0.0342	J				0.06 - 2.0	Wash Basin Area,
	F620SB030	Surface	1.68	=	0.73	U		0.06 - 2.0	Outside Loading Dock
	F620SB034	Surface	0.361	=	0.73	U		0.06 - 2.0	Wash Basin Area,
		Subsurface	0.576	=	4.22	J		0.04 - 0.57	Beneath Loading Dock
	F620SB053	Surface	1.06	=				0.06 - 2.0	
		Subsurface	1.52	=				0.04 - 0.57	

Background range from the combined Zones F and G grid sample concentrations

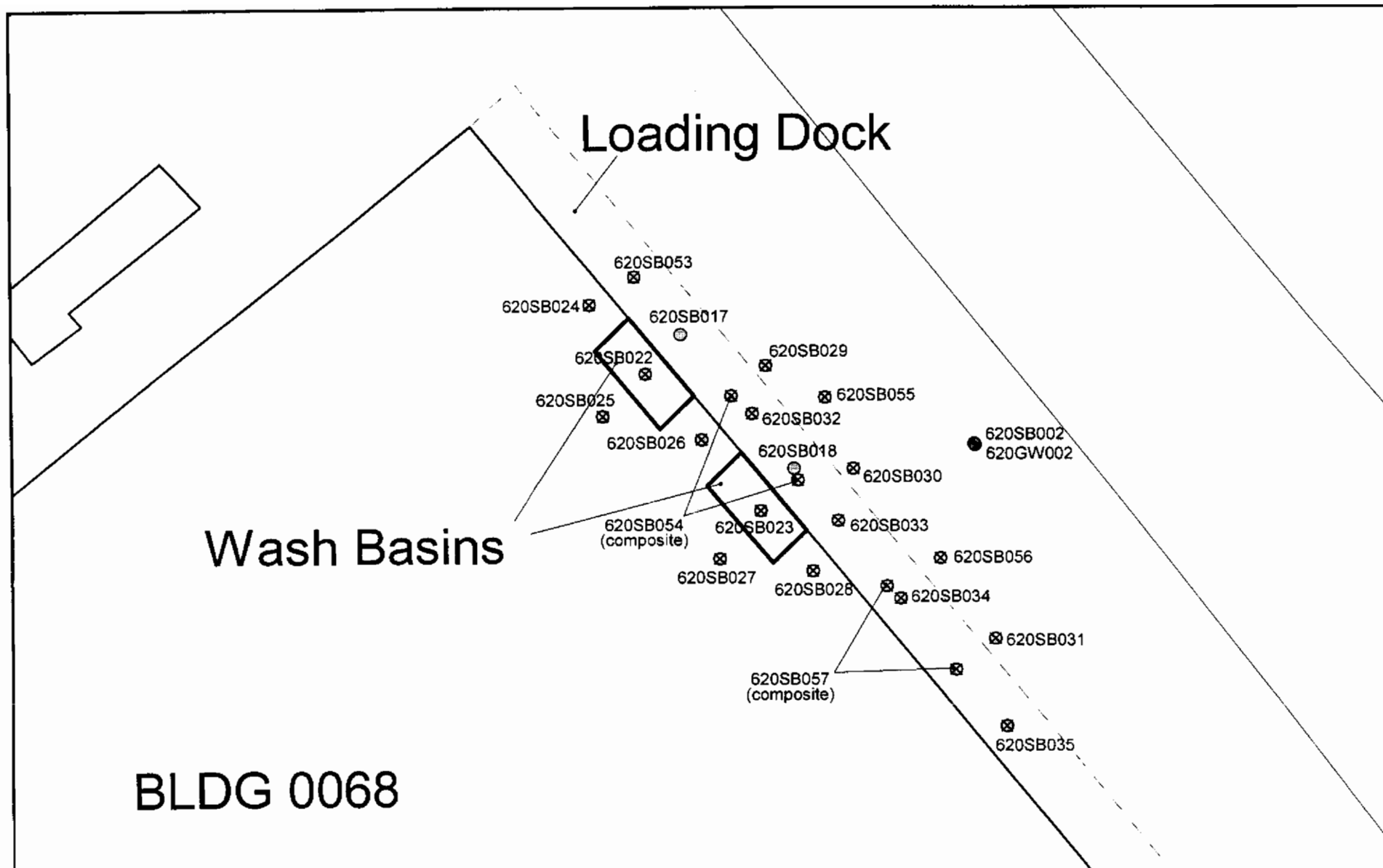
= Sample concentration

J Estimated concentration

SPLP Synthetic Precipitation Leaching Procedure

TCLP Toxicity Characteristic Leaching Procedure

U Analyte not detected; value is the detection limit



- Groundwater Well
- RFI Soil Sample
- ⊗ IM Pre-Excavation Sample
- Roads - Lines
- ▭ Buildings

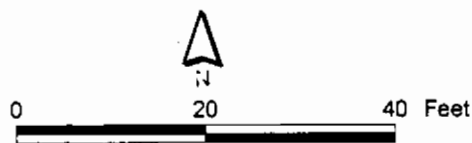


Figure 2-1
IM Pre-Excavation Samples in Wash Basin Area
AOC 620 IM Work Plan - Phase II
Zone F
Charleston Naval Complex

CH2MHILL

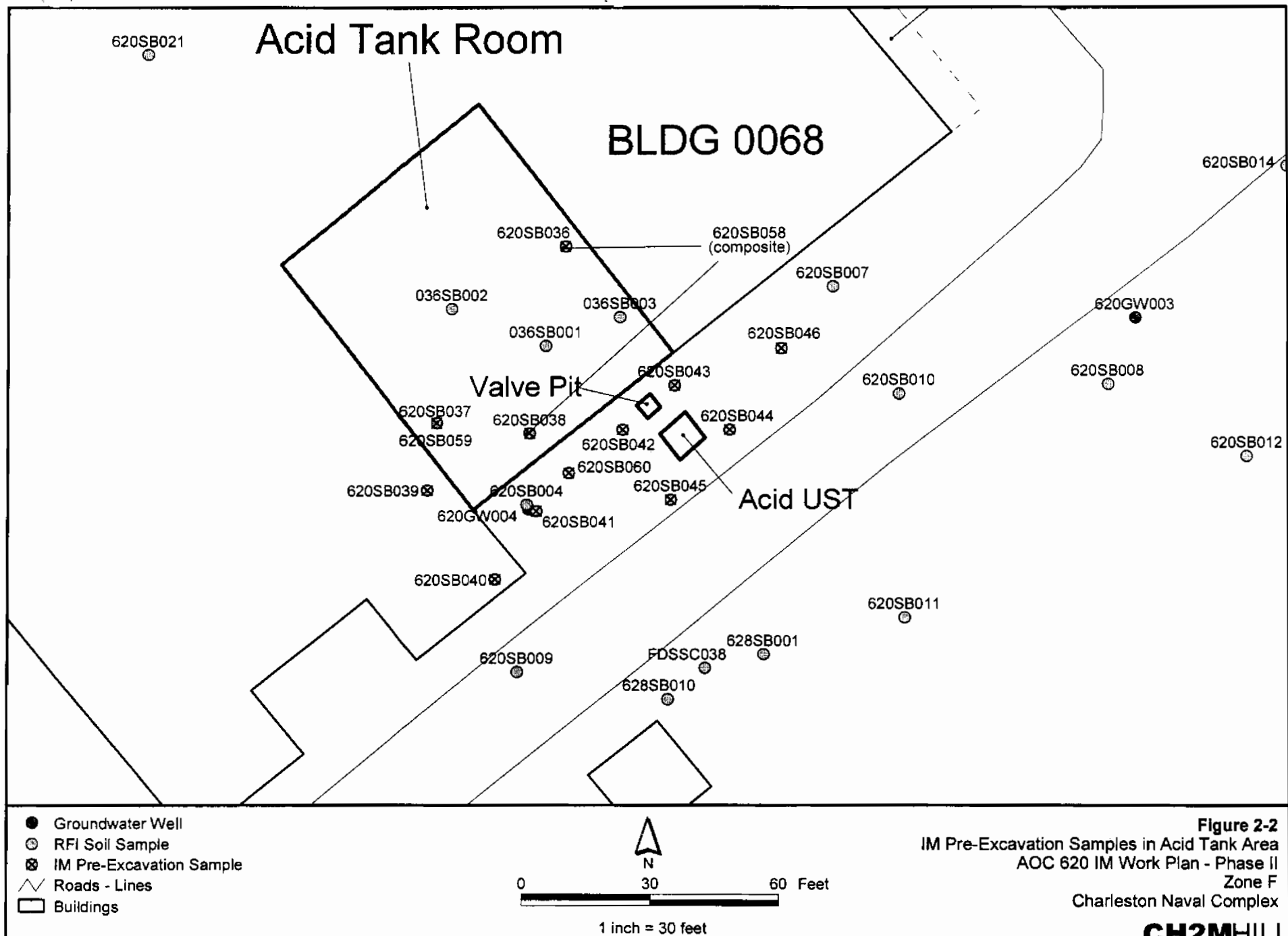
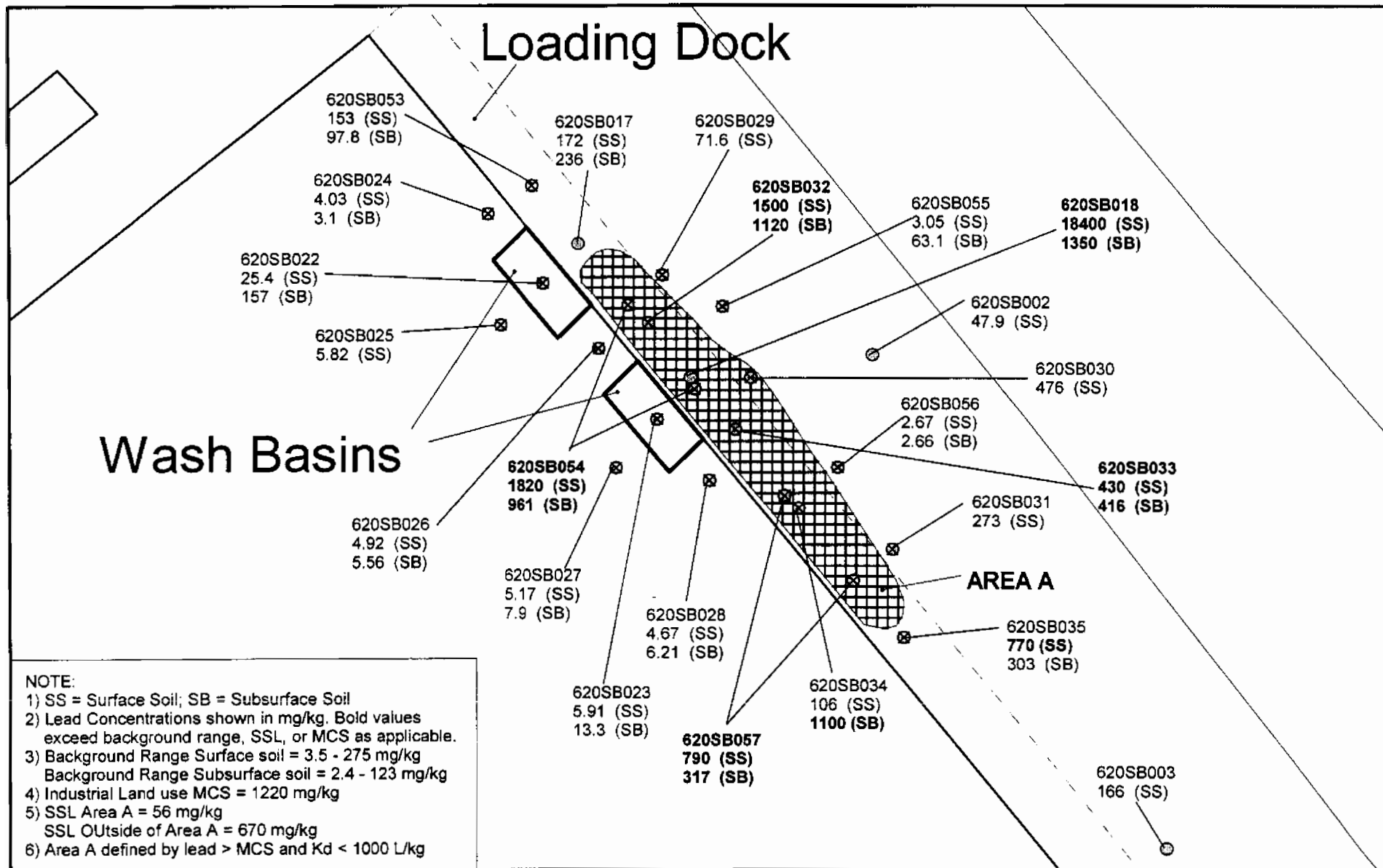
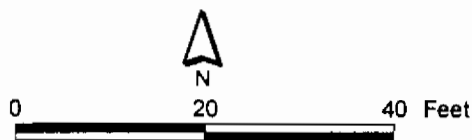


Figure 2-2
IM Pre-Excavation Samples in Acid Tank Area
AOC 620 IM Work Plan - Phase II
Zone F
Charleston Naval Complex

CH2MHILL



- RFI Soil Sample
- ⊠ IM Pre-Excavation Sample
- Roads - Lines
- ▭ Buildings



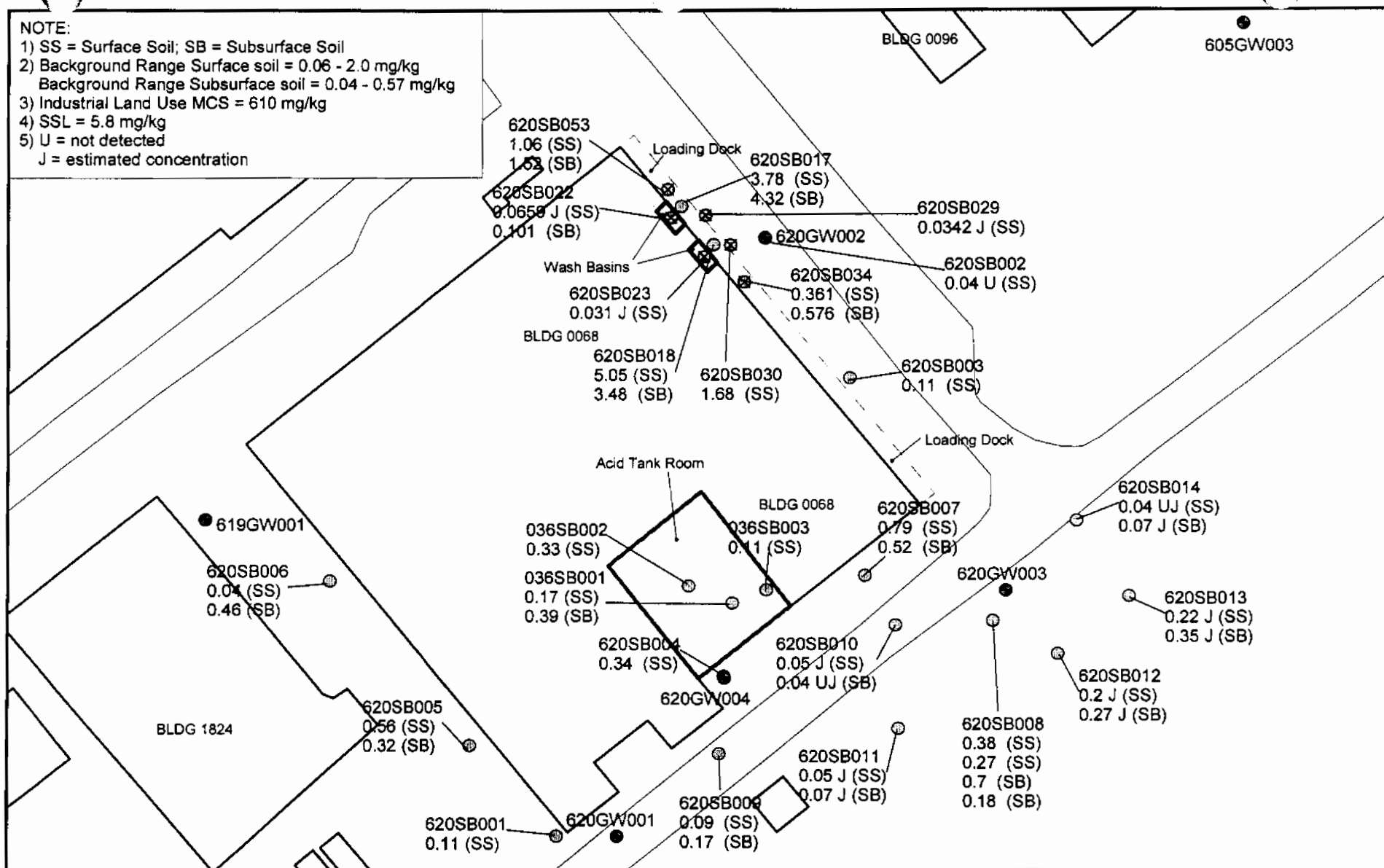
1 inch = 20 feet

Figure 2-3
Lead in Soil in Wash Basin Area
AOC 620 IM Work Plan - Phase II
Zone F
Charleston Naval Complex

CH2MHILL

NOTE:

- 1) SS = Surface Soil; SB = Subsurface Soil
- 2) Background Range Surface soil = 0.06 - 2.0 mg/kg
Background Range Subsurface soil = 0.04 - 0.57 mg/kg
- 3) Industrial Land Use MCS = 610 mg/kg
- 4) SSL = 5.8 mg/kg
- 5) U = not detected
- J = estimated concentration



- Groundwater Well
- ⊙ RFI Soil Sample
- ⊗ IM Pre-Excavation Sample
- Roads - Lines
- ▭ Buildings

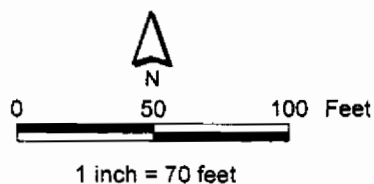


Figure 2-4
Mercury in Soil
AOC 620 IM Workplan - Phase II
Zone F
Charleston Naval Complex

CH2MHILL

Acid Tank Room

BLDG 0068

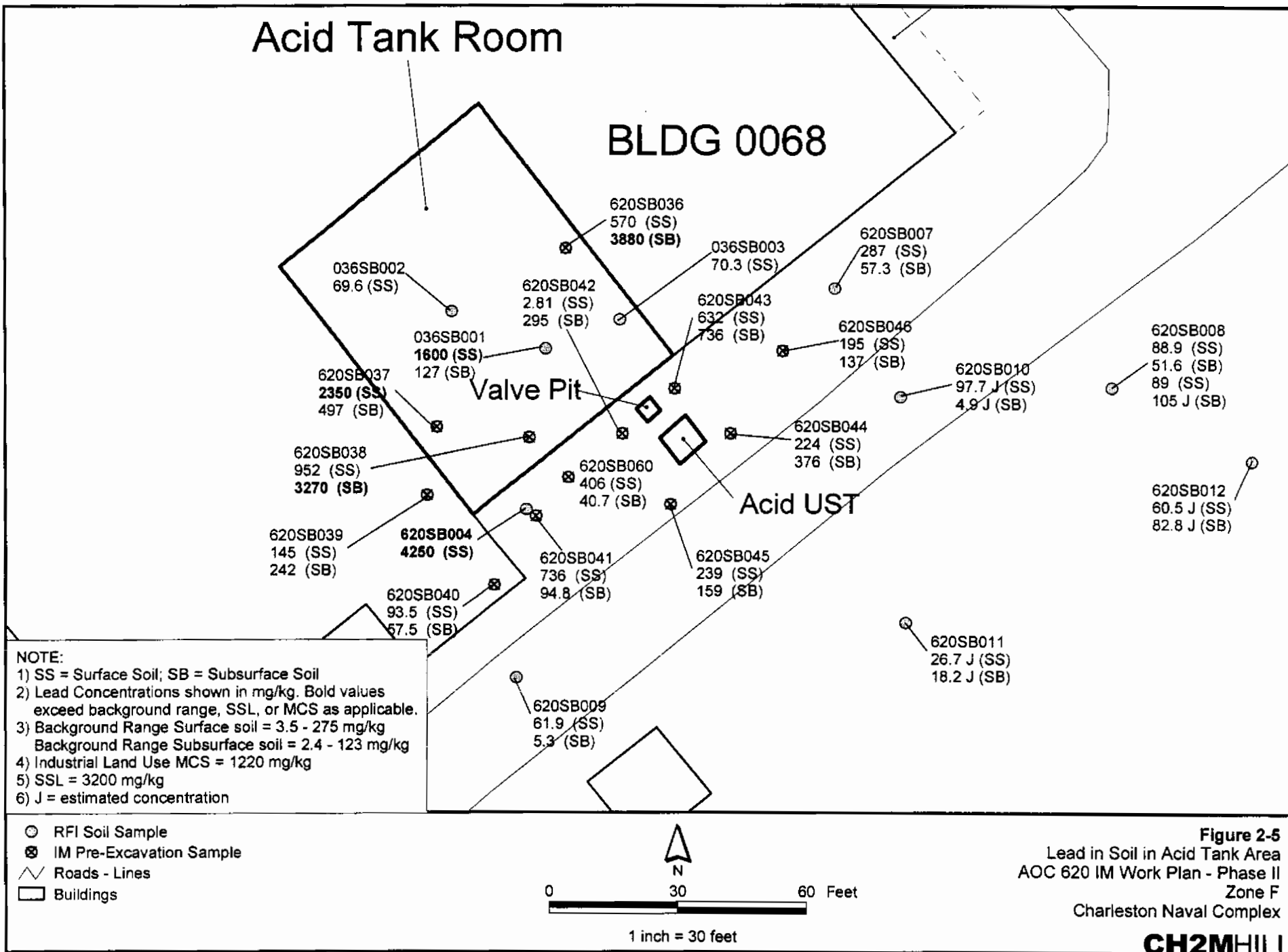
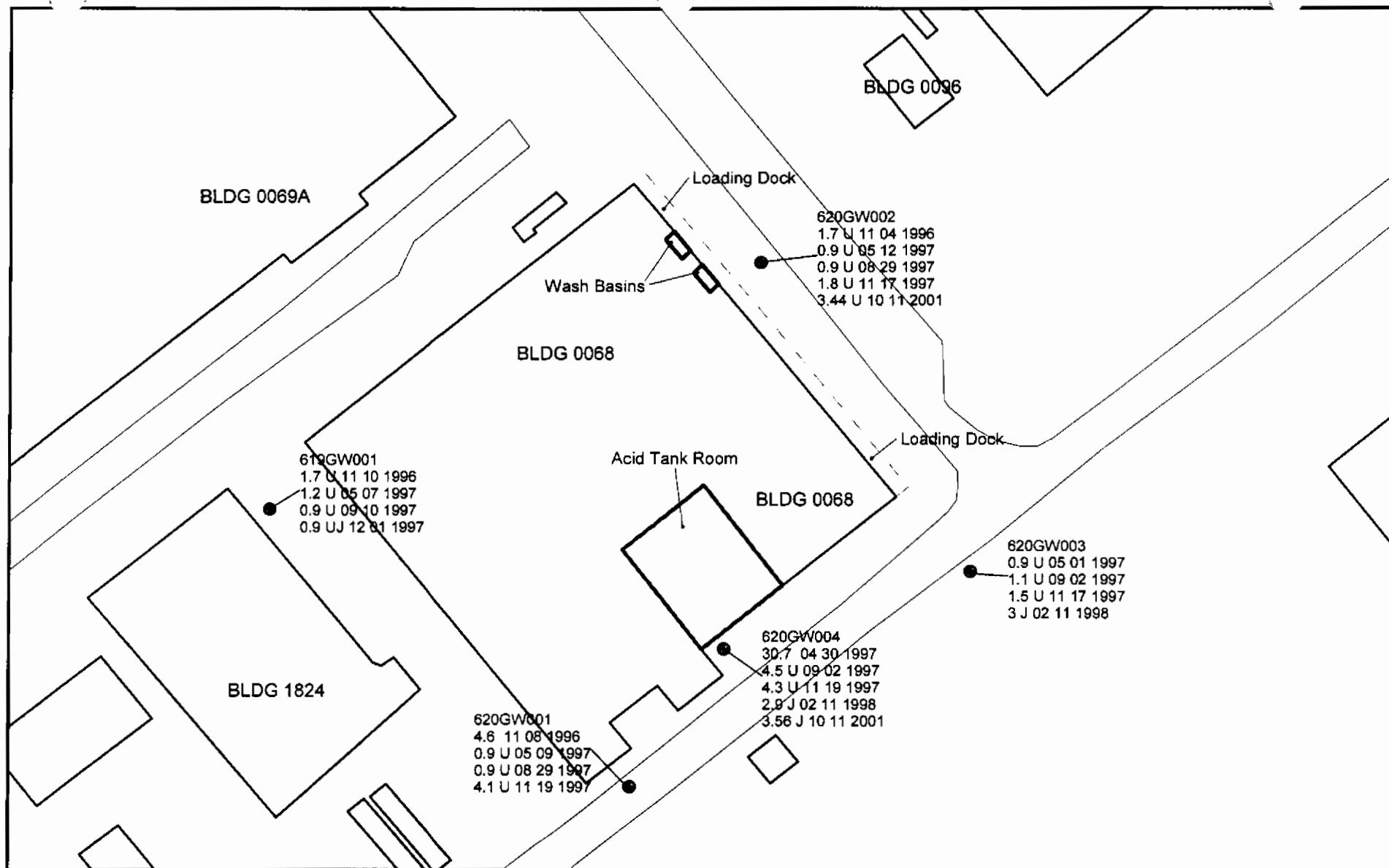


Figure 2-5
Lead in Soil in Acid Tank Area
AOC 620 IM Work Plan - Phase II
Zone F
Charleston Naval Complex

CH2MHILL



- Groundwater Well
- Roads - Lines
- Buildings

NOTE:

- 1) Lead in ug/L
- 2) MCL = 15 ug/L
- 3) Background Reference Concentrations
Zone F – Not Listed
Zone G = 4.6 ug/L
- 4) U = Not Detected
J = Estimated Concentration

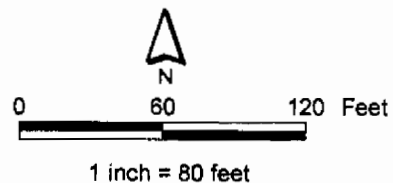


Figure 2-6
Lead in Groundwater
AOC 620 IM Work Plan - Phase II
Zone F
Charleston Naval Complex

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Section 3.0

3.0 Identification of Media Cleanup Standards at AOC 620

This section identifies the MCSs and describes how they are derived. The MCSs will be based on background levels, human health exposure-based concentrations, and soil concentrations protective of groundwater. The target MCS for surface soil (up to 1-ft depth) at AOC 620 will be no less than the upper bound of the background range and the minimum of the risk-based concentration (RBC) and the SSL. The target MCS for subsurface soil (between 1-ft depth and the water table, no greater than 4 ft) will be the greater of the SSL or the upper bound of the background range. Once a chemical of concern (COC) is established as exceeding background concentrations in a contaminated area, soils will be remediated to the lower of health-based MCSs and leachability-based MCSs (i.e., SSLs).

The exposure-based MCSs are described in the subsections below. For groundwater protection, SSLs are calculated using area-specific soil partitioning values and site-specific DAFs. The derivation of the site-specific DAF, the area-specific partitioning coefficients, and the area-specific SSLs are also described in the subsections below.

3.1 Background Concentrations for the COCs

Any concentrations detected within the range of background concentrations established for Zones F and G will be considered not related to site releases and will not be addressed further in this IM. The ranges of concentrations identified in Zones F and G grid-based background samples are listed in Table 3-1.

3.2 Health-Based MCS

To evaluate surface soil for the IM, concentrations will be compared to criteria derived on the basis of direct exposure to human receptors. The type of receptor is identified based on the current and future land use for the area. AOC 620 and the surrounding area are designated for industrial land use. Although a consideration will be given to achieve cleanup levels more stringent than restricted land use, the area will remain industrial and practical target goals will be selected to achieve industrial worker health protection. Thus, both an unrestricted land use-based MCS and an industrial use-based MCS are listed below

for each of the two COCs, lead, and mercury. However, ultimate objectives are selected on the basis of industrial land use.

3.2.1 Health-Based MCS for Lead

For unrestricted land use at the CNC, the BRAC Cleanup Team (BCT) has agreed to use the generally accepted target screening level, which may be used as a cleanup level of 400 mg/kg in surface soil, which is based on protection of residential children against lead exposure. A CNC-specific lead target value was developed to be protective of adults against lead exposure in areas identified for current and future industrial land use. The target lead MCS was derived from the U.S. Environmental Protection Agency (EPA) Adult Lead Methodology (ALM), as detailed in the *Technical Memorandum: Adult Lead Methodology (ALM) Derived Target Lead Concentrations for Industrial Land Use*, (CH2M-Jones, November 9, 2001).

The ALM is specifically used for calculating target lead concentrations protective of adult receptors, e.g., site workers. The ALM uses a biokinetic slope factor to represent lead biokinetics, and an exposure model in which all exposure pathways, except the soil ingestion pathway, are represented by a background blood-lead concentration. As detailed in the *Technical Memorandum*, the ALM calculates a target cleanup value of 1,218 mg/kg, (rounded to three significant digits for 1,220 mg/kg) for industrial use sites. Average site residual concentrations will be compared with the target MCS value of 1,220 mg/kg. AOC 620 is zoned for heavy industrial usage, and land use restrictions are planned to be compatible with this usage.

3.2.2 Health-Based MCS for Mercury

The MCS for mercury is the RBC value from EPA Region III (October 2000) for mercuric chloride (inorganic mercury). The RBC value listed for unrestricted land use is 23 mg/kg, and for industrial land use is 610 mg/kg. Because AOC 620 is located in an area designated for current and future industrial use, an MCS value of 610 mg/kg is appropriate for protection of human health for workers in the area.

3.3 Site-Specific SSLs

Site-specific SSLs were derived using EPA SSL guidance (Soil Screening Guidance, EPA 1996). First, a DAF was calculated specific to AOC 620 and the surrounding area. Then, area-specific partition coefficients (K_d) values were calculated from the SPLP data collected at AOC 620. These two factors were used to calculate specific SSLs at AOC 620. While DAF

values vary depending on site properties, they are the same for all COCs at a site. K_d values depend on chemical properties and vary with the dynamics between the chemical and the soil in which it is present. The subsections below present the methods used to derive the SSLs.

3.3.1 Site-Specific DAF

DAFs have been calculated using the method presented in the EPA Soil Screening Guidance, 1996. Equations 11 and 12 from that document are used to derive DAF, as shown below.

Equation 11: $DAF = 1 + Kd/iL$

Where K = hydraulic conductivity = 4.0 ft/day = 445 m/yr

i = hydraulic gradient = 0.02 ft/ft

d = mixing zone thickness (from equation 12)

I = infiltration rate = 0.14 m/yr unpaved; 0.026 m/yr paved

L = source length parallel to groundwater flow direction = 80 ft = 25 m

The hydraulic conductivity is extrapolated from the USGS model presented in *Hydrogeology and Simulation of Ground-Water Flow in the Surficial Aquifer System in the Area of Charleston Naval Base, North Charleston, South Carolina, 1995-97, United States Geological Survey Administrative Report 1999*, and reproduced in Appendix A. The hydraulic gradient is estimated from the potentiometric surface map presented in the *Zone F RFI Report, Revision 0* (EnSafe, 1997) for AOC 620; a copy of it is presented in Appendix A. The mixing zone thickness is a function of the site properties, as described below. The derivation for the infiltration rates is presented in Appendix A; the unpaved condition will be used to evaluate a worst-case SSL. The source lengths for Area A and for the Acid Tank Area are both approximately 80 ft, using the longest dimension of each area containing elevated metals concentrations. These are conservative estimates for L , and are independent of the direction of groundwater flow; however, variations in this value have only minor effects on the resulting DAF calculation.

The mixing zone thickness, d , in meters, is calculated from Equation 12 from the Soil Screening Guidance:

Equation 12: $d = (0.0112L^2)^{0.5} + d_a[1 - \exp\{(-LI)/(Kd_a)\}]$

Where L = source length parallel to groundwater flow direction = 25 m

d_a = aquifer thickness = 9.8 m

I = infiltration rate = 0.14 m/yr for unpaved

K = hydraulic conductivity = 445 m/yr

i = hydraulic gradient = 0.02

For the unpaved surface, the mixing zone thickness at AOC 620 is 3.0 m. Using this value, the DAF for the future unpaved condition in both the Wash Basin Area and the Acid Tank Area estimates as 8.7. For comparison, using an infiltration rate of 0.026 m/yr, representative of a paved condition, the DAF at AOC 620 calculates to 38.2. The more conservative value based on the unpaved scenario will be used to develop the leachability-based MCS for lead and mercury at AOC 620, because after demolition the site will be unpaved for at least a portion of the time.

3.3.2 Partitioning Coefficient for Lead

A partitioning coefficient (K_d) was calculated for each sample, on the basis of the quantities of soil and water used in the SPLP test and the resulting soil and leachate concentrations. The K_d is the ratio between the soil and the leachate concentrations, expressed in units of liters per kilogram (L/kg). Calculations are presented in Appendix B. The partitioning coefficient for each sample that was analyzed for lead by SPLP is listed in Table 3-2, and is shown in Figure 3-1.

As described in the *Technical Memorandum: Application of Soil-Screening Levels (SSLs) at Charleston Naval Complex* (CH2M-Jones, March 9, 2001), in the case where the metal is not detected in the leachate, one-half the detection limit is used for the leachate concentration to calculate K_d . This was done for the samples from 620SB036, 620SB037, and 620SB056.

Lead Partitioning Coefficient in Wash Basin Area

As shown in Table 3-2, the K_d for the soil beneath the loading dock in the Wash Basin Area was calculated at values ranging from 103 to 19,000 L/kg. The K_d for soil in Area A was calculated between 242 and 847 L/kg, corresponding to the elevated lead levels detected in Area A. A geometric mean of the K_d values was calculated to provide a representative coefficient for Area A, 430 L/kg. Calculations are provided in Appendix B. This value is lower than partitioning coefficients typically reported in the literature [range = 700 to 23,000 L/kg for soil pH from 6.4 to 8.7 (Understanding Variation in Partition Coefficient, K_d , Values [EPA 402-R-99-004B, August 1999])]. Although low K_d values generally indicate a greater potential for migration to groundwater, it should be noted that no lead has been

1 detected in groundwater in 620GW002, the monitoring well adjacent to and immediately
2 downgradient from Area A (see Figure 2-6).

3 The K_d for soil outside of Area A was calculated between 103 and 19,000 L/kg. It was noted
4 that the K_d value is not meaningful where lead was not detected in the leachate and the total
5 lead concentration in soil is very low (e.g. less than 10 mg/kg), such as at 620SB056. In
6 addition, unrepresentatively low K_d values can be calculated in samples where the soil lead
7 concentrations are low and the SPLP concentrations are low. This is the case with sample
8 620SB05501, where total lead was reported as 3.05 mg/kg and the SPLP leachate was
9 reported at an estimated concentration of 24.8 J $\mu\text{g/L}$, resulting in a K_d value of 103 L/kg. It
10 should be noted that lead in the subsurface soil sample from the same location, 620SB055,
11 had a concentration of 63.1 mg/kg and a K_d of 2202 L/kg, a value more in line with the
12 range of partitioning coefficients for the unimpacted soils in the Wash Basin Area.
13 Therefore, the K_d value of 103 L/kg was considered an outlier and not representative of the
14 area outside of Area A, and was not used to calculate the mean coefficient. The geometric
15 mean of the K_d values for the soil outside of Area A was estimated at 5100 L/kg.
16 Calculations are provided in Appendix B.

17 **Lead Partitioning Coefficient in Acid Tank Area**

18 As shown in Table 3-2, the partitioning coefficients calculated for the soil in the Acid Tank
19 Area range from 10,300 L/kg to 451,000 L/kg, which, except for the single elevated value at
20 620SB036, is near the normal range quoted in the literature. Because the K_d value at
21 620SB036 is an order of magnitude higher than the other K_d values in the Acid Tank Area, it
22 was considered an outlier and was excluded from the geometric mean calculation. Exclusion
23 of this sample data yields a more protective K_d and a more protective SSL value. A
24 conservative value of 24,000 L/kg was estimated for the Acid Tank Area.

25 **3.3.3 Partitioning Coefficient for Mercury**

26 Partitioning coefficients for each SPLP sample were calculated from the total mercury
27 concentration and the leachate concentration. For the surface soil samples in which no
28 mercury was detected in the leachate, one-half the detection limit was used as the leachate
29 concentration to arrive at a K_d value. As shown in Table 3-2, the partitioning coefficient for
30 the sample from outside the loading dock was calculated at 4580 L/kg, and the coefficients
31 for the samples collected beneath the loading dock were calculated at 969 and 116 L/kg,
32 with a geometric mean of 340 L/kg. Similar to the case for the lead-partitioning coefficient,
33 it was noted that the mercury K_d value for the soil beneath the loading dock was an order of
34 magnitude lower than that for soil outside of the loading dock area.

3.3.4 SSL for Lead at AOC 620

SSLs were calculated using the following equation:

$$SSL = K_d \times MCL \times DAF$$

Where MCL = Maximum Contaminant Level. The National Primary Drinking Water Standard Action Level of 0.015 mg/L was used for lead although it is applicable to treated water at the tap. The SSLs calculated from the area-specific K_d values and the site-specific DAF are listed in Table 3-2.

Wash Basin Area SSL

The SSL for the future unpaved condition in Area A was calculated at 56 mg/kg, and for a future paved condition, the SSL was calculated at 240 mg/kg. Outside of Area A, the SSL for the future unpaved condition was calculated at 670 mg/kg, and 2900 mg/kg for the paved condition.

Acid Tank Room Area SSL

The K_d values derived in Appendix B and listed in Table 3-2 were in the general range of published values. A geometric mean K_d of 24,000 L/kg was identified for the soil in the Acid Tank Area, not including the apparent outlier at 620SB036. The SSL equation described above was used to derive an SSL of 3200 mg/kg for the future unpaved condition, and 14,000 mg/kg for the paved condition.

3.3.5 SSL for Mercury at AOC 620

Table 3-2 and Appendix B show that the partitioning coefficient for mercury measured from soil sample 620SB030, outside of the loading dock, was calculated at 4600 L/kg. This is an order of magnitude higher than the K_d measured in Area A, with a geometric mean of 340 L/kg. To be conservative, the Area A K_d was used for AOC 620 mercury SSL calculations. An MCL of 0.002 mg/L was assumed in the SSL equation. The DAF values used for the lead SSL calculations, with a conservative value of source length L of 80 ft, were used to calculate an SSL of 5.8 mg/kg for the unpaved future scenario, and 26 mg/kg for the paved scenario.

3.4 Application of MCS for Lead at AOC 620

The MCS for surface soil (0 to 1 ft) is the lower value of the RBC and the site-specific SSL, in areas exceeding background conditions where resulting site averages do not exceed MCS values. The MCS for subsurface soil (greater than 1 ft bls) is the SSL, once background levels are exceeded in an area. For AOC 620, the lead SSL-based MCS is identified differently for

- 1 the three areas of the site. Table 3-3 presents the proposed final cleanup concentrations for
 2 each area and soil depth.

TABLE 3-3
 Final Lead Cleanup Concentrations
Phase II IM Work Plan, AOC 620/SWMU 36, Zone F, Charleston Naval Complex

Area	Health- Based MCS mg/kg	SSL- Based MCS mg/kg	Background Concentration Range mg/kg		Final Cleanup Concentration mg/kg	
			Surface Soil (0 - 1 ft)	Subsurface Soil (greater than 1 ft)	Surface Soil (0 - 1 ft)	Subsurface Soil (greater than 1 ft)
Wash Basin Area, Area A	1,220	56	3.5 - 275	2.4 - 123	275	123
Wash Basin Area, outside of Area A	1,220	670	3.5 - 275	2.4 - 123	670	670
Acid Tank Area	1,220	3,200	3.5 - 275	2.4 - 123	1,220	3,200

3 3.5 Application of MCS for Mercury at AOC 620

- 4 Table 3-4 presents all mercury data from AOC 620. As seen in Figure 2-4 and Table 3-3, all
 5 surface soil RFI samples at AOC 620 reveal mercury concentrations at least one order of
 6 magnitude less than the health-based MCS for unrestricted land use and two orders of
 7 magnitude less than the industrial land use MCS.

- 8 As noted in Table 3-4, there is no evidence of mercury concentrations greater than the site-
 9 specific SSL of 5.8 mg/kg for unpaved site conditions. It should be noted that mercury has
 10 not been detected in groundwater at AOC 620. Therefore, remediation of mercury-
 11 containing soils is not warranted for protection of human health or of groundwater, and will
 12 not be addressed further in the IM.

TABLE 3-1
Background Concentration Range (Zones F and G)
Phase II IM Work Plan, AOC 620/SWMU 36, Zone F, Charleston Naval Complex

	Lead, mg/kg	Mercury, mg/kg
Surface Soil	3.5 – 275	0.06 – 2.0
Subsurface Soil	2.4 – 123	0.04 – 0.57

TABLE 3-2
 Partitioning Coefficients and SSLs
 Phase II IM Work Plan, AOC 620/SWMU 36, Zone F, Charleston Naval Complex

Boring	Sample Location	Soil Sample Type	Lead				Mercury					
			Soil Concentration mg/kg	Kd, L/kg	MCL, µg/L	Unpaved SSL, mg/kg	Paved SSL, mg/kg	Soil Conc, mg/kg	Kd, L/kg	MCL, µg/L	Unpaved SSL, mg/kg	Paved SSL, mg/kg
F620SB030	Wash Basin Area, Outside of Loading Dock	Surface	476	NC				1.68	4,583			
F620SB055	Wash Basin Area, Outside of Loading Dock	Surface	3.05	103 ^a				NC	NC			
F620SB056	Wash Basin Area, Outside of Loading Dock	Surface	2.67	290 ^b				NC	NC			
		Subsurface	2.66	289 ^b				NC	NC			
F620SB053	Wash Basin Area, Beneath Loading Dock,	Surface	153	4,561				1.06	NC			
	North of Area A	Subsurface	97.8	3629				1.52	NC			
F620SB035	Wash Basin Area, Beneath Loading Dock, South of Area A	Surface	770	19,039				NC	NC			
Geometric Mean, Wash Basin Area, Outside of Area A (excludes F620SB056 and surface F620SB055 - see footnote)				5,100	15	670	2,900		4,600	2	80	350
F620SB032	Wash Basin Area, Beneath Loading Dock (Area A)	Surface	1,500	847				NC	NC			

TABLE 3-2
 Partitioning Coefficients and SSLs
 Phase II IM Work Plan, AOC 620/SWMU 36, Zone F, Charleston Naval Complex

Boring	Sample Location	Soil Sample Type	Lead					Mercury				
			Soil Concentration mg/kg	Kd, L/kg	MCL, µg/L	Unpaved SSL, mg/kg	Paved SSL, mg/kg	Soil Conc, mg/kg	Kd, L/kg	MCL, µg/L	Unpaved SSL, mg/kg	Paved SSL, mg/kg
F620SB033	Wash Basin Area, Beneath Loading Dock (Area A)	Subsurface	416	242				NC	NC			
F620SB034	Wash Basin Area, Beneath Loading Dock (Area A)	Surface	106	NC				0.361	969			
		Subsurface	1100	381				0.576	116			
Geometric Mean, Wash Basin Area Beneath Loading Dock, Area A				430	15	56	250		340	2	5.8	26
F620SB036	Beneath Acid Tank Room	Subsurface	3880	451143 ^c				NC	NC			
F620SB037	Beneath Acid Tank Room	Subsurface	497	57,771				NC	NC			
F620SB038	Beneath Acid Tank Room	Subsurface	3270	23,676				NC	NC			
F620SB043	Acid Tank Area, Outside Bldg	Surface	632	10,324				NC	NC			
Geometric Mean, Acid Tank Area (excludes F620SB036 - outlier)				2,400	15	3,200	14,000					

^a Kd not representative of area outside of Area A

^b Soil lead concentration too low and lead not detected in leachate; Kd not meaningful

^c Kd not representative of area

TABLE 3-2

Partitioning Coefficients and SSLs

Phase II IM Work Plan, AOC 620/SWMU 36, Zone F, Charleston Naval Complex

Boring	Sample Location	Soil Sample Type	Lead					Mercury				
			Soil Concentration mg/kg	Kd, L/kg	MCL, µg/L	Unpaved SSL, mg/kg	Paved SSL, mg/kg	Soil Conc, mg/kg	Kd, L/kg	MCL, µg/L	Unpaved SSL, mg/kg	Paved SSL, mg/kg
Kd	Site-Specific Partitioning Coefficient											
MCL	Maximum Contaminant Level											
NC	SPLP or other analysis not conducted											
SSL	Site-Specific Soil Screening Level for Groundwater Protection. SSL based on DAF = 8.7 for unpaved; 38.2 for paved											

TABLE 3-3
 Final Lead Cleanup Concentrations
Phase II IM Work Plan, AOC 620/SWMU 36, Zone F, Charleston Naval Complex

Area	Health- Based MCS mg/kg	SSL- Based MCS mg/kg	Background Concentration Range mg/kg		Final Cleanup Concentration mg/kg	
			Surface Soil (0 – 1 ft)	Subsurface Soil (greater than 1 ft)	Surface Soil (0 – 1 ft)	Subsurface Soil (greater than 1 ft)
Wash Basin Area, Area A	1,220	56	3.5 - 275	2.4 - 123	275	123
Wash Basin Area, outside of Area A	1,220	670	3.5 - 275	2.4 - 123	670	670
Acid Tank Area	1,220	3,200	3.5 - 275	2.4 - 123	1,220	3,200

TABLE 3-4

Mercury in Surface and Subsurface Soil

Phase II IM Work Plan, AOC 620/SWMU 36, Zone F, Charleston Naval Complex

	Surface Soil		Subsurface Soil	
RBC, Unrestricted Land Use	23		NA	
RBC, Industrial Land Use	610		NA	
SSL, DAF = 8.7	5.8		5.8	
Background Range	0.06 - 2.0		0.04 - 0.57	
Units	mg/kg		mg/kg	

Sample Location	Surface Concentration	Qualifier	Subsurface Concentration	Qualifier
F036SB001	0.17	J	0.39	J
F036SB002	0.33	J	NS	
F036SB003	0.11	J	NS	
F620SB001	0.11	=	NS	
F620SB002	0.04	U	NS	
F620SB003	0.11	=	NS	
F620SB004	0.34	=	NS	
F620SB005	0.56	=	0.32	=
F620SB006	0.04	U	0.46	=
F620SB007	0.79	=	0.52	=
F620SB008	0.27	=	0.18	=
(resample for SPLP evaluation)	0.38	=	0.70	=
F620SB009	0.09	=	0.17	=
F620SB010	0.05	J	0.04	UJ
F620SB011	0.05	J	0.07	J
F620SB012	0.20	J	0.27	J
F620SB013	0.22	J	0.35	J
F620SB014	0.04	UJ	0.07	J
F620SB017	3.78	=	4.32	=
F620SB018	5.05	=	3.48	=
F620SB022	0.0659	J	0.101	=
F620SB023	0.031	J	NS	
F620SB029	0.0342	J	NS	
F620SB030	1.68	=	NS	
F620SB034	0.361	=	0.576	=
F620SB053	1.06	=	1.52	=

Background Range from combined Zones F and G background samples

J = estimated concentration

NA = Not Applicable

NS = Not Sampled

Q = Data qualifier

TABLE 3-4

Mercury in Surface and Subsurface Soil

Phase II IM Work Plan, AOC 620/SWMU 36, Zone F, Charleston Naval Complex

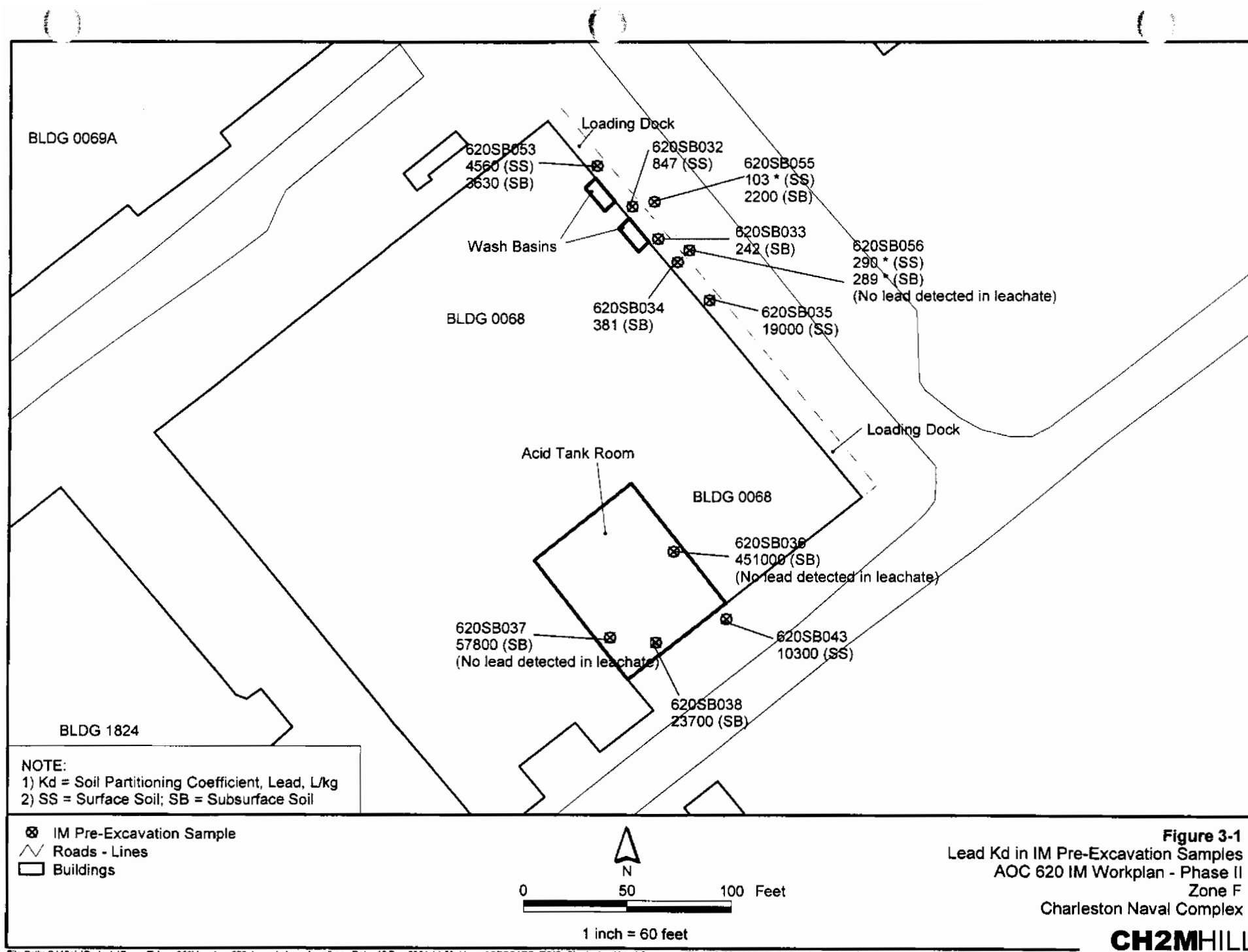
	Surface Soil	Subsurface Soil
RBC, Unrestricted Land Use	23	NA
RBC, Industrial Land Use	610	NA
SSL, DAF = 8.7	5.8	5.8
Background Range	0.06 - 2.0	0.04 - 0.57
Units	mg/kg	mg/kg

Sample Location	Surface Concentration	Qualifier	Subsurface Concentration	Qualifier
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RBC = EPA Region IX PRGs, November 2000

U = Analyte not detected; value is detection limit

UJ = Analyte not detected; value is estimated detection limit



4.0 Technical Approach to IM Soil Removal

This section outlines the technical approach to the removal of lead-contaminated soil in two areas, the Acid Tank and the Wash Basin Area, where lead concentrations were detected above the MCS, either the industrial use RBC of 1,220 mg/kg, the area-specific SSL, or background concentrations, as appropriate. Other areas of AOC 620 contain lead at or near the background reference concentration, and less than the unrestricted land use screening concentration of 400 mg/kg.

As discussed in Section 3.0 of this IM Work Plan, the soils containing mercury at AOC 620 do not warrant remediation.

4.1 Contaminant Delineation

The lead concentrations in Phase I IM surface soil samples shown in Table 4-1 were screened against a CNC-specific MCS of 1,220 mg/kg for industrial land use, an area-specific SSL, and the surface soil background range of concentrations for combined Zones F and G. The lead concentrations in Phase I IM subsurface soil samples shown in Table 4-2 were screened against the area-specific SSL and the subsurface soil background range of concentrations for combined Zones F and G.

The extent of contamination in the Wash Basin and Acid Tank Areas has been evaluated to estimate the area for soil removal for the Phase II IM. The data from the RFI and the Phase I IM are discussed below. A comprehensive list of lead concentrations in surface soil at AOC 620 is presented in Table 4-1, and a similar list for subsurface soil at AOC 620 is presented in Table 4-2. Figures 2-3 and 2-5 show lead concentrations for the two main areas of the site.

4.1.1 Wash Basin Area

Wash Basin Area - Outside of Area A

The area outside of Area A, including beneath the building, appears to be minimally impacted. Including samples collected previously for the AOC 609 RFI, surface soil lead concentrations were reported ranging from 3 to 770 mg/kg, and subsurface soil concentrations were reported ranging from 3 to 303 mg/kg. The area mean lead concentration in the one-half acre exposure area must be less than the health-based MCS to be protective of human health. The entire Wash Basin Area may be considered one-half acre, extending as far south as sample 620SB003, located 90-ft southeast from the wash basins.

1 The average lead concentration in surface soil within the exposure area at the Wash Basins,
2 and not including the samples located inside Area A, is 129 mg/kg. Therefore, the residual
3 concentrations after removal of Area A soils are much lower than the unrestricted land use –
4 based MCS of 400 mg/kg and the industrial land use-based MCS of 1220 mg/kg. Therefore,
5 the soil outside of Area A does not warrant remedial action with respect to protection of
6 human health, and remaining soils in the area are suitable for unrestricted land use.

7 The SSL-based MCS for this area is 670 mg/kg. Using the highest concentration of surface or
8 subsurface lead from each boring, the average lead concentration throughout the area
9 outside of the building and outside of Area A is 226 mg/kg, compared to the SSL of 670
10 mg/kg. Therefore, the soil outside of Area A does not require remedial action with regard
11 to protection of groundwater, because residual concentrations do not indicate a leachability
12 concern for this area.

13 Using the highest concentration of surface or subsurface lead from each boring collected
14 from soil beneath the building, the average lead concentration is 29 mg/kg, less than the
15 more conservative SSL-based MCS for Area A, as well as lower than the health-based MCS
16 for unrestricted land use. Therefore, lead in soil beneath the building is not likely to
17 adversely effect the groundwater or present a health concern in the future, and does not
18 require remedial action.

19 Therefore, the area outside of Area A does not require remediation to meet industrial use
20 standards, and meets standards for unrestricted land use.

21 **Wash Basin Area - Area A**

22 Area A is located near the wash basins underneath the loading dock (see Figure 2-3). Lead
23 concentrations detected in RFI and Phase I IM samples indicate a release from the wash
24 basin drain line beneath the loading dock. The highest lead concentration was detected
25 opposite the southernmost wash basin, with lead concentrations in excess of the MCS
26 extending between sample location 620SB017 and sample location 620SB035. Area A has
27 been defined as the area beneath the loading dock between these two sample locations. Area
28 A is bounded on the west by the building grade wall and on the east by the edge of the
29 loading dock.

30 The pre-excavation samples located outside of the loading dock indicated lead
31 concentrations below the MCS, and except for one location (620SB030, 476 mg/kg), below
32 the unrestricted land use RBC. The excavation area will include Area A beneath the loading

1 dock and extend 3 feet to the east in the area of 620SB030 to include the soil at 620SB030.
2 Figure 4-1 shows the lateral extent of the IM soil excavation area in the Wash Basin Area.

3 **4.1.2 Acid Tank Area**

4 **Acid Tank Area - Inside Building 68**

5 As seen in Tables 4-1 and 4-2, the Phase I IM samples have indicated that the soil beneath
6 the Acid Tank room has lead concentrations greater than the health-based MCS of 1,220
7 mg/kg in surface soil, and the SSL-based MCS of 3,200 mg/kg in subsurface soil. The lateral
8 extent of the area with elevated lead concentrations has not been identified to the north or
9 east beneath the building. Pre-excavation sampling will be continued until the soil with lead
10 concentrations greater than the MCS has been delineated, as provided in the Phase I IM
11 Work Plan. The Phase III IM Work Plan will describe the extent of contamination beneath
12 Building 68 in the Acid Tank Area.

13 **Acid Tank Area - Outside of Building 68**

14 The soil outside of Building 68 south and east of the Acid Tank Room has lead
15 concentrations ranging from 3 mg/kg to 736 mg/kg, with one exception at 620SB004 (4,250
16 mg/kg), where monitoring well 620GW004 was installed. The soil at 620SB004 has been re-
17 sampled (620SB041), resulting in a lead concentration of 736 mg/kg. The average of these
18 two values (2,500 mg/kg) is used to evaluate area-wide lead concentrations outside of the
19 building in the Acid Tank Area.

20 The average lead concentration was calculated for surface soil south and east of Building 68,
21 including RFI sample locations identified for AOC 620. This area is approximately 250 x 110
22 ft, or 2/3 of an acre. The average surface soil lead concentration is 315 mg/kg, which is less
23 than the unrestricted land use MCS, both health-based (400 mg/kg) and SSL-based (3,200
24 mg/kg). Therefore, surface soil outside of Building 68 in the Acid Tank Area does not
25 require remediation. Likewise, subsurface soil outside of Building 68 in the Acid Tank Area
26 has an average lead concentration of 142 mg/kg, and does not require remediation.

27 **4.2 Soil Excavation in Area A**

28 The loading dock will be removed and the soil in Area A will be excavated to a 4-ft depth
29 below grade, or to groundwater if the groundwater level is shallower than 4 ft. Soil
30 excavation will not be conducted beneath below-grade walls or pile caps.

31 Dust control and runoff control measures will be implemented during concrete removal to
32 reduce the potential for lead-contaminated soils to become airborne. During excavation, the

IM areas will be monitored for dust levels using appropriate real-time measuring instruments. If dust levels are higher than the action levels set forth in the CNC Health and Safety Plan, adequate dust suppression measures will be taken. All sampling, excavation, and stockpiling activities will be performed according to the approved CNC Health and Safety Plan. The excavations will be backfilled with clean soil after removal of lead-contaminated soil.

4.3 Waste Management and Disposal

Four waste streams will be generated as part of this IM:

- Concrete debris from Building 68 floors and loading dock
- excavated soils
- decontamination wastes
- personal protective equipment (PPE) and stockpile liners

Uncontaminated concrete debris will be disposed of in a construction debris landfill.

Excavated soils will be characterized in accordance with South Carolina Hazardous Waste Management Regulations (Section SCDHEC R.61-79.261) and disposed of in accordance with all applicable regulations and permits. Soils excavated from outside of the building will be transferred immediately to disposal containers (e.g., lined roll-off box or similar container).

Table 4-3 presents the results of TCLP tests on composite soil samples from both the Wash Basin Area and the Acid Tank Room Area. Soils that test hazardous by TCLP (greater than 5 mg/L lead) will be delivered to a permitted Treatment, Storage, and Disposal Facility (TSDF) and soils with TCLP less than 5 mg/L lead will be disposed of as non-hazardous material. Existing data indicate that the soil within the southern half of Area A is not hazardous. Additional soil samples may be collected within Area A to better delineate the hazardous from the non-hazardous soils.

Decontamination wastes and PPE will be disposed in accordance with appropriate regulations. Offsite transportation and disposal will be performed by properly permitted and licensed subcontractors. Materials designated for offsite disposal will be documented, tracked, and their disposition verified. This information will be documented in the IM Completion Report generated for AOC 620.

TABLE 4-1
 Summary of Lead in Surface Soil
 Phase II IM Work Plan, AOC 620/SWMU 36, Zone F, Charleston Naval Complex

Location	Sample Date	Concentration mg/kg		RBC mg/kg	SSL mg/kg	Background
						Range mg/kg
F036SB001	10/09/1996	1,600	=	1220	3200	3.5 - 275
F036SB002	10/08/1996	69.6	=	1220	3200	3.5 - 275
F036SB003	10/09/1996	70.3	=	1220	3200	3.5 - 275
F619SB011	09/10/1996	58.7	=	1220	3200	3.5 - 275
F620SB001	09/16/1996	42	=	1220	3200	3.5 - 275
F620SB002	08/27/1996	48	=	1220	670	3.5 - 275
F620SB003	09/16/1996	166	=	1220	670	3.5 - 275
F620SB004	09/10/1996	4,250	=	1220	3200	3.5 - 275
F620SB005	09/16/1996	79	=	1220	3200	3.5 - 275
F620SB006	10/04/1996	10	J	1220	3200	3.5 - 275
F620SB007	01/09/1997	287	=	1220	3200	3.5 - 275
F620SB008	01/09/1997	89	=	1220	3200	3.5 - 275
F620SB008	10/15/1999	89	=	1220	3200	3.5 - 275
F620SB009	01/10/1997	62	=	1220	3200	3.5 - 275
F620SB010	11/17/1999	98	J	1220	3200	3.5 - 275
F620SB011	11/16/1999	27	J	1220	3200	3.5 - 275
F620SB012	11/16/1999	61	J	1220	3200	3.5 - 275
F620SB013	11/16/1999	78	J	1220	3200	3.5 - 275
F620SB014	11/16/1999	44	J	1220	3200	3.5 - 275
F620SB017	06/06/2001	172	=	1220	670	3.5 - 275
F620SB018	06/06/2001	18,400	=	1220	56	3.5 - 275
F620SB022	10/10/2001	25.4	=	1220	670	3.5 - 275
F620SB023	10/10/2001	5.91	=	1220	670	3.5 - 275
F620SB024	10/10/2001	4.03	=	1220	670	3.5 - 275
F620SB025	10/10/2001	5.82	=	1220	670	3.5 - 275
F620SB026	10/10/2001	4.92	=	1220	670	3.5 - 275
F620SB027	10/10/2001	5.17	=	1220	670	3.5 - 275
F620SB028	10/10/2001	4.67	=	1220	670	3.5 - 275
F620SB029	10/10/2001	71.6	=	1220	670	3.5 - 275
F620SB030	10/10/2001	476	=	1220	56	3.5 - 275
F620SB031	10/10/2001	273	=	1220	670	3.5 - 275
F620SB032	10/10/2001	1,500	=	1220	56	3.5 - 275
F620SB033	10/10/2001	430	=	1220	56	3.5 - 275
F620SB034	10/10/2001	106	=	1220	56	3.5 - 275
F620SB035	10/10/2001	770	=	1220	670	3.5 - 275
F620SB036	10/10/2001	570	=	1220	3200	3.5 - 275
F620SB037	10/10/2001	2,350	=	1220	3200	3.5 - 275
F620SB038	10/10/2001	952	=	1220	3200	3.5 - 275
F620SB039	10/10/2001	145	=	1220	3200	3.5 - 275

TABLE 4-1
 Summary of Lead in Surface Soil
 Phase II IM Work Plan, AOC 620/SWMU 36, Zone F, Charleston Naval Complex

Location	Sample Date	Concentration mg/kg		RBC mg/kg	SSL mg/kg	Background
						Range mg/kg
F620SB040	10/10/2001	93.5	=	1220	3200	3.5 - 275
F620SB041	10/10/2001	736	=	1220	3200	3.5 - 275
F620SB042	10/10/2001	2.81	=	1220	3200	3.5 - 275
F620SB043	10/10/2001	632	=	1220	3200	3.5 - 275
F620SB044	10/10/2001	224	=	1220	3200	3.5 - 275
F620SB045	10/10/2001	239	=	1220	3200	3.5 - 275
F620SB046	10/10/2001	195	=	1220	3200	3.5 - 275
F620SB053	11/26/2001	153	=	1220	670	3.5 - 275
F620SB054	11/26/2001	1,820	=	1220	56	3.5 - 275
F620SB055	11/26/2001	3.05	=	1220	670	3.5 - 275
F620SB056	11/26/2001	2.67	=	1220	670	3.5 - 275
F620SB057	11/26/2001	790	=	1220	56	3.5 - 275
F620SB060	11/26/2001	406	=	1220	3200	3.5 - 275

Background Range is concentrations of combined Zone F and G grid samples

SSL based on site-specific Kd values and site-specific DAF = 8.7 for unpaved condition

Values in bold type exceed MCS and background range

= Actual measured concentration

RBC Risk-Based Concentration, based on industrial exposure, ALM

TABLE 4-2
 Summary of Lead in Subsurface Soil
 Phase II IM Work Plan, AOC 620/SWMU 36, Zone F, Charleston Naval Complex

Location	Sample Date	Concentration mg/kg		SSL mg/kg	Background Range mg/kg
F036SB001	10/09/1996	127	=	3200	2.4 - 123
F620SB005	09/16/1996	58.3	=	3200	2.4 - 123
F620SB006	10/04/1996	34	J	3200	2.4 - 123
F620SB007	01/09/1997	57.3	=	3200	2.4 - 123
F620SB008	01/09/1997	51.6	=	3200	2.4 - 123
F620SB008	10/15/1999	105	J	3200	2.4 - 123
F620SB009	01/10/1997	5.3	=	3200	2.4 - 123
F620SB010	11/17/1999	4.9	J	3200	2.4 - 123
F620SB011	11/16/1999	18.2	J	3200	2.4 - 123
F620SB012	11/16/1999	82.8	J	3200	2.4 - 123
F620SB013	11/16/1999	88.3	J	3200	2.4 - 123
F620SB014	11/16/1999	27.9	J	3200	2.4 - 123
F620SB017	06/06/2001	236	=	56	2.4 - 123
F620SB018	06/06/2001	1,350	=	56	2.4 - 123
F620SB022	10/10/2001	157	=	670	2.4 - 123
F620SB023	10/10/2001	13.3	=	670	2.4 - 123
F620SB024	10/10/2001	3.1	=	670	2.4 - 123
F620SB026	10/10/2001	5.56	=	670	2.4 - 123
F620SB027	10/10/2001	7.9	=	670	2.4 - 123
F620SB028	10/10/2001	6.21	=	670	2.4 - 123
F620SB032	10/10/2001	1,120	=	56	2.4 - 123
F620SB033	10/10/2001	416	=	56	2.4 - 123
F620SB034	10/10/2001	1,100	=	56	2.4 - 123
F620SB035	10/10/2001	303	=	670	2.4 - 123
F620SB036	10/10/2001	3,880	=	3200	2.4 - 123
F620SB037	10/10/2001	497	=	3200	2.4 - 123
F620SB038	10/10/2001	3,270	=	3200	2.4 - 123
F620SB039	10/10/2001	242	=	3200	2.4 - 123
F620SB040	10/10/2001	57.5	=	3200	2.4 - 123
F620SB041	10/10/2001	94.8	=	3200	2.4 - 123
F620SB042	10/10/2001	295	=	3200	2.4 - 123
F620SB043	10/10/2001	736	=	3200	2.4 - 123
F620SB044	10/10/2001	376	=	3200	2.4 - 123
F620SB045	10/10/2001	159	=	3200	2.4 - 123
F620SB046	10/10/2001	137	=	3200	2.4 - 123
F620SB053	11/26/2001	97.8	=	670	2.4 - 123
F620SB054	11/26/2001	961	=	56	2.4 - 123

TABLE 4-2

Summary of Lead in Subsurface Soil

Phase II IM Work Plan, AOC 620/SWMU 36, Zone F, Charleston Naval Complex

Location	Sample Date	Concentration mg/kg		SSL mg/kg	Background Range mg/kg
F620SB055	11/26/2001	63.1	=	670	2.4 - 123
F620SB056	11/26/2001	2.66	=	670	2.4 - 123
F620SB057	11/26/2001	317	=	56	2.4 - 123
F620SB060	11/26/2001	40.7	=	3200	2.4 - 123

Background Range is concentrations of combined Zone F and G grid samples

SSL based on site-specific Kd values and site-specific DAF = 8.7 for unpaved condition

Values in bold type exceed MCS and background range

= Actual measured concentration

TABLE 4-3
TCLP Results
Phase II IM Work Plan, AOC 620/SWMU 36, Zone F, Charleston Naval Complex

Sample Location	Soil Sample Type	Lead Concentration mg/kg		TCLP Leachate mg/L	TCLP Limit mg/L	Boring Location
F620SB054	Surface	1820	=	31.2	= 5	Wash Basin Area,
(composite)	Subsurface	961	=	0.743	=	Beneath Loading Dock
F620SB057	Surface	790	=	0.273	=	(Area A)
(composite)	Subsurface	317	=	0.084	J	
F620SB058	Subsurface	3575 *	=	1.98	= 5	Acid Tank Area,
(composite)						Beneath Acid Tank Room
F620SB059	Surface	2350 **	=	0.0172	U	

Values in bold type exceed MCS or TCLP limit

* composite of F620SB036 and F620SB038; average lead concentration

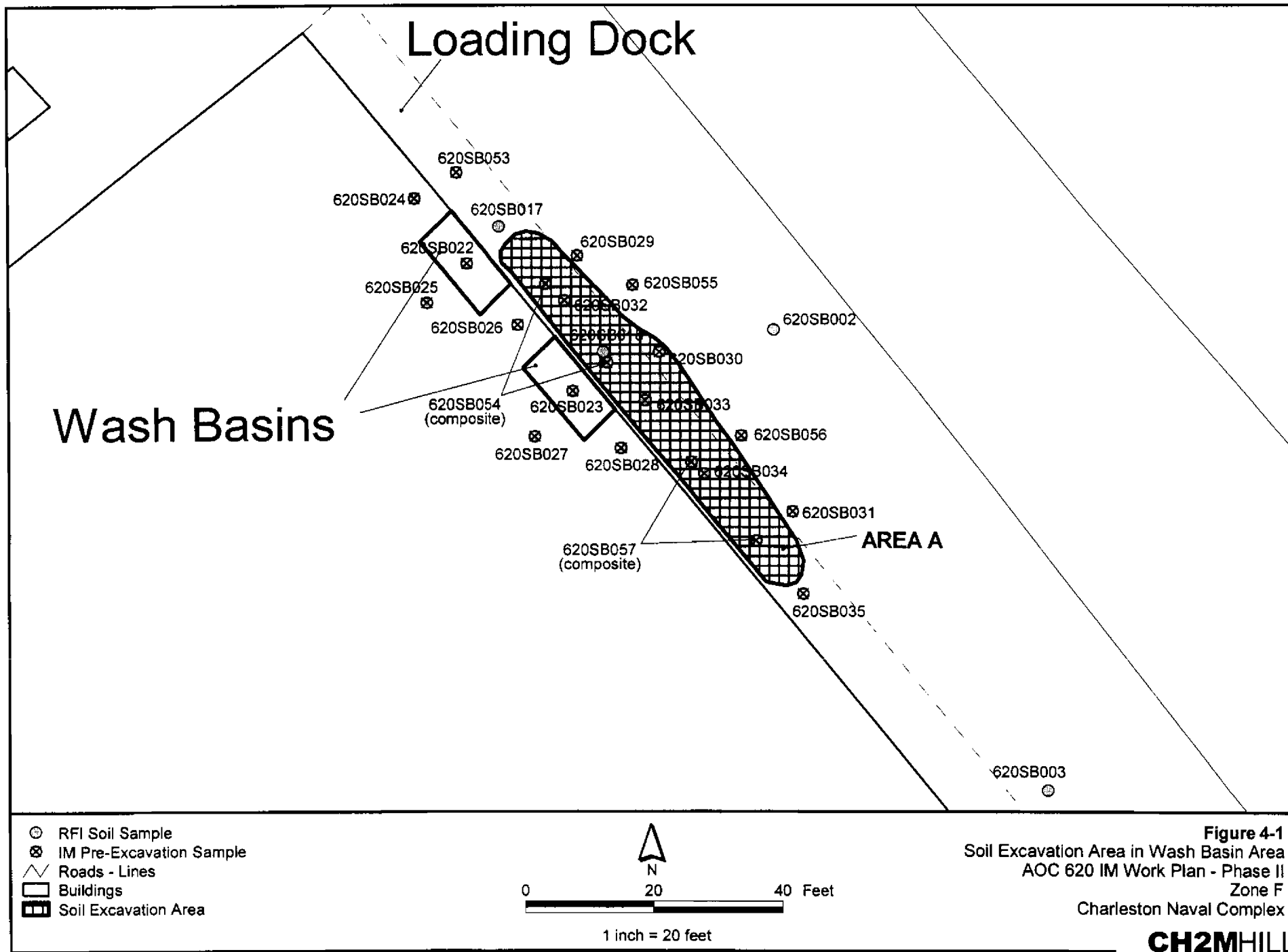
** lead concentration from 620SB037

= Actual measured concentration

J Estimated concentration

TCLP Toxicity Characteristic Leaching Procedure

U Analyte not detected; value is the detection limit



Section 5.0

5.0 Phases II and III Interim Measure Completion Report

A soil IM Completion Report will be submitted within 60 days of receipt of the final data for the Phase III soil excavation IM. The Completion report will summarize the actions that were taken and provide the following information:

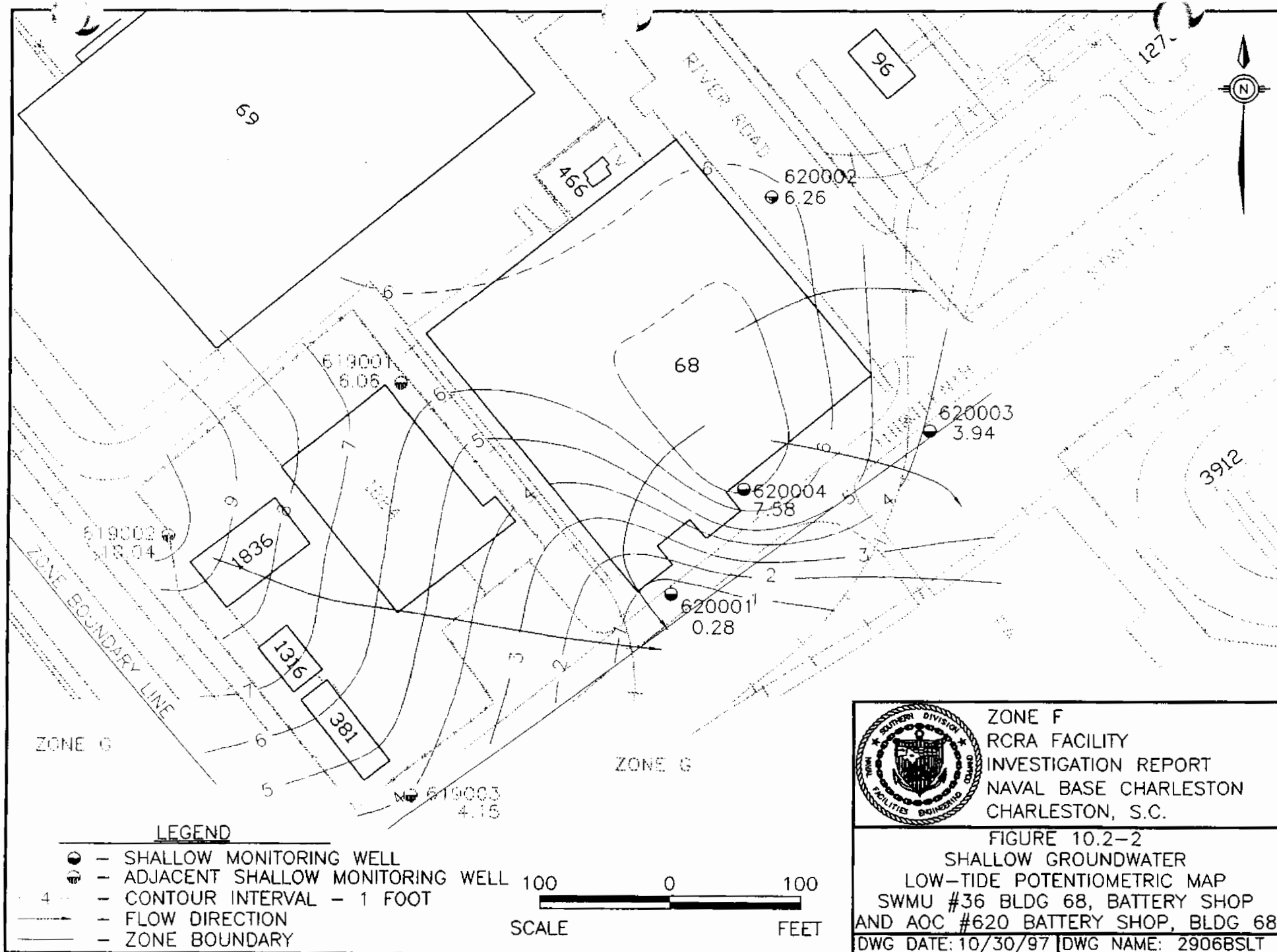
- Analytical data reports from the pre-excavation sampling
- Excavated area measurements and volumes of excavated soil
- Nature and volume of excavated wastes generated
- Waste transportation and disposal records
- Site photographs
- Problems encountered during the excavation IM, if any, and the corrective measures implemented

Section 6.0

1 6.0 References

- 2 CH2M-Jones. *Technical Memorandum: Application of Soil-Screening Levels (SSLs) at Charleston*
3 *Naval Complex*. March 9, 2001.
- 4 CH2M-Jones. *Phase I Interim Measure Work Plan, AOC 620/SWMU 36, Zone F*. Revision 0.
5 September 2001.
- 6 CH2M-Jones. *Technical Memorandum: Adult Lead Methodology (ALM) Derived Target Lead*
7 *Concentrations for Industrial Land Use*. November 9, 2001.
- 8 EnSafe Inc. *Zone F RFI Report*. Revision 0. NAVBASE Charleston. 1997.

Appendix A



Infiltration Rate Derivation

Infiltration can be defined as:

$$I = (P - ET)(1 - C_r)$$

Where:

I = Infiltration (in/yr)

P = Precipitation (in/yr)

ET = Evapotranspiration (in/yr)

C_r = runoff coefficient

For Charleston, SC, a value of 46 in/yr is used for P (Park, 1985) and a value of 39.25 in/yr is used for ET (Laboratory of Climatology). For unpaved areas, a value of 0.20 is used for C_r (Florida DOT). For poorly paved (moderately degraded asphaltic concrete) surfaces, a value of 0.85 is used for C_r .

Using these values in the above equation results in a calculated infiltration of:

5.1 in/yr, or 0.14 m/yr for unpaved surfaces, and

1.0 in/yr, or 0.026 m/yr for paved surfaces.

References

- Park, A.D., 1985, "The Groundwater Resources of Charleston, Berkeley, and Dorchester Counties, South Carolina: South Carolina Water Resources Commission Report 139", 146 p.
- Laboratory of Climatology, Map.
- State of Florida Department of Transportation, Drainage Manual, Volume 2, 1987.

Mercury

		620SB03001	620SB03401	620SB03403
Initial Soil Concentration	mg/kg	1.68	0.361	0.576
SPLP Water Concentration	mg/L	0.000365	0.000365	0.00422
Soil mass	kg	0.1	0.1	0.1
Water volume	L	2	2	2
Total contaminant mass in soil	mg	0.168	0.0361	0.0576
Total contaminant mass in water	mg	0.00073	0.00073	0.00844
Adjusted soil concentration	mg/kg	1.6727	0.3537	0.4916
Partition Coefficient Kd	L/kg	4583	969	116

SPLP non-detect for 620SB03001 and 620SB03401 - leachate concentration assumed at 1/2 detection limit.

MCL, mg/L 0.002

SSL = Kd x MCL x DAF

DAF, unpaved 8.7

DAF, paved 38.2

geometric mean of Kd beneath loading dock

(620SB03401 and 620SB03403)

rounded off

336 340

SSL, unpaved

5.8 5.8

SSL, paved

26 26

Kd outside of loading dock

(620SB03001)

rounded off

4583 4600

SSL, unpaved

80 80

SSL, paved

350 350

Lead

Sample Number	620SB05301	620SB05302	620SB03201	620SB03303	620SB03403	620SB03501	620SB05501	620SB05502	620SB05601	620SB05602	620SB03603	620SB03703	620SB03803	620SB04301	
Initial Soil Concentration	mg/kg	153	97.8	1500	416	1100	770	3.05	63.1	2.67	2.66	3880	497	3270	832
SPLP Water Concentration	mg/L	0.0334	0.0268	1.73	1.59	2.74	0.0404	0.0248	0.0284	0.0086	0.0086	0.0086	0.0086	0.138	0.0611
Soil mass	kg	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Water volume	L	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Total contaminant mass in soil	mg	15.3	9.78	150	41.6	110	77	0.305	6.31	0.267	0.266	388	49.7	327	63.2
Total contaminant mass in water	mg	0.0668	0.0536	3.46	3.18	5.48	0.0808	0.0496	0.0568	0.0172	0.0172	0.0172	0.0172	0.276	0.1222
Adjusted soil concentration	mg/kg	152.332	97.264	1465.4	384.2	1045.2	769.192	2.554	62.532	2.496	2.488	3879.828	496.828	3267.24	630.778
Partition Coefficient Kd	L/kg	4561	3629	847	242	381	19039	103	2202	290	289	451143	57771	23676	10324
Area A															
Surface soil	X		X				X	X		X					X
Subsurface soil		X		X	X				X		X		X	X	
wash basin area - beneath loading dock	X	X	X	X	X	X	X								
wash basin area - outside of loading dock								X	X	X	X				
inside acid tank room											X	X	X		
outside acid tank room - outdoors															X

shaded indicates lead not detected in leachate; value is one-half detection limit

For DAF = 1, SSL = Kd x MCL

		Individual SSL, mg/kg													
DAF, unpaved	8.7	595	474	111	32	50	2485	13	287	38	38	58874	7539	3090	1347
DAF, paved	38.2	2613	2080	485	138	219	10910	59	1262	166	165	258505	33103	13566	5915
No dilution/attenuation	1	68	54	13	4	6	286	2	33	4	4	6767	867	355	155

MCL, mg/L 0.015

SSL = Kd x MCL x DAF

geometric mean of Kd beneath loading dock, Area A

SSL, unpaved	427	rounded off	430
SSL, paved	56		58
	245		240

geometric mean of Kd Wash Basin Area, outside of Area A

SSL, unpaved	5132	rounded off	5100
SSL, paved	670		670
	2941		2900

geometric mean of Kd in acid tank area

SSL using geometric mean and unpaved DAF	24170	rounded off	24000
SSL using geometric mean and paved DAF	3154		3200
	13850		14000

Disregard Kd as not meaningful where leachate non-detect and soil lead extremely low (No 620SB05601 or 620SB05602)

Disregard 620SB05501 as not representative

Disregard 620SB03603 as not representative

Site: SWMU 35/AOC 620
Media: Surface Soil
Units: mg/kg

Chemical	CASRN	Samples	Detects	NonDetects	FOD	Min Detect	Max Detect	Avg Detect	Mean	Min nondetect	Max nondetect	W-Test	t-Statistic	UCL95 norm	H-statistic	UCL96 log	UCL95 nonparm	UCL95 bootstrap
Aroclor-1254		16	4	12	25%	0.233	1.12	0.54075	0.166369	0.018	0.106	NONPARAMETRIC	1.753	0.291684	2.594	0.335306	0.0375	0.276814
Aroclor-1260		16	6	10	38%	0.0458	0.51	0.215633	0.107138	0.018	0.106	LOGNORMAL	1.753	0.165572	2.458167	0.189772	0.028	0.163528

Site: SWMU 36/AOC 620
Media: Surface Soil
Units: mg/kg
Chemical: Aroclor-1254
CASRN:

STATISTICS

N	16
Detects	4
FOD	25%
Mean of Detect	0.541
Min of Detect	0.2330
Max of Detect	1.12
Best Estimate of Mean (arithmetic)	0.3
Best Estimate of Mean (geometric)	0.1
Nondetects at 1/2 DL	YES

95% UPPER CONFIDENCE LIMITS FOR MEAN

UCL95 Normal	0.3
<i>t</i> -statistic	1.75
UCL95 Lognormal	0.3
<i>H</i> -statistic	2.59
UCL95 Nonparametric	0.0375
UCL95 Bootstrap	0.277

95% UPPER TOLERANCE INTERVAL

UTL95 Normal	0.683
<i>coverage</i>	95%
UTL95 Lognormal	0.638
<i>coverage</i>	95%
UTL95 Nonparametric	1.12
<i>coverage</i>	94%

DISTRIBUTION TESTING

Population is best described as:	NONPARAMETRIC
W_{normal}	0.567
W_{log}	0.845
$W_{\alpha = 0.05}$	0.887

Notes:

1. If population does not fit normal or lognormal distribution, check Q-Q plots and W-test values. The population may be close enough to one of those distributions to subjectively select a normal or lognormal distribution.
2. For site data, if the selected UCL95 exceeds the Max Detect, the Max Detect should be chosen as the EPC.
3. Lognormal UCL or UTL values calculated for less than 30 samples may be widely inflated.
4. If there is >90% nondetection, it is generally impossible to calculate a UTL or UCL with any level of confidence.

Site:	SWMU 36/AOC 620
Media:	Surface Soil
Units:	mg/kg
Chemical:	Aroclor-1260
CASRN:	

STATISTICS

N	16
Detects	6
FOD	38%
Mean of Detect	0.216
Min of Detect	0.0458
Max of Detect	0.51
Best Estimate of Mean (arithmetic)	0.2
Best Estimate of Mean (geometric)	0.1
Nondetects at 1/2 DL	YES

95% UPPER CONFIDENCE LIMITS FOR MEAN

UCL95 Normal	0.2
<i>t</i> -statistic	1.75
UCL95 Lognormal	0.190
<i>H</i> -statistic	2.46
UCL95 Nonparametric	0.028
UCL95 Bootstrap	0.164

95% UPPER TOLERANCE INTERVAL

UTL95 Normal	0.348
<i>coverage</i>	95%
UTL95 Lognormal	0.369
<i>coverage</i>	95%
UTL95 Nonparametric	0.51
<i>coverage</i>	94%

DISTRIBUTION TESTING

Population is best described as:	LOGNORMAL
W_{normal}	0.672
W_{log}	0.913
$W_{\alpha = 0.05}$	0.887

Notes:

1. If population does not fit normal or lognormal distribution, check Q-Q plots and W-test values. The population may be close enough to one of those distributions to subjectively select a normal or lognormal distribution.
2. For site data, if the selected UCL95 exceeds the Max Detect, the Max Detect should be chosen as the EPC.
3. Lognormal UCL or UTL values calculated for less than 30 samples may be widely inflated.
4. If there is >90% nondetection, it is generally impossible to calculate a UTL or UCL with any level of confidence.

***Phase II Interim Measure; Soil Removal in
Loading Dock Area (March 4 - 8, 2002)***



Roll-off boxes delivered and exclusion zone set



Dock concrete cut



Loosening cut concrete loading dock slabs



Loading dock removed in soil excavation area



Groundwater at south end



Excavating north end



Excavating south end



North end of excavation



Backfilling north end



Central portion of excavation



Placing excavated soil into roll-off box



Backfilling central section



Finish grading



Finish grading

***Phase III Interim Measure; Soil Removal in
Acid Tank Room Area (December 2 - 3, 2002)***



Acid room tanks, looking northeast.



Last remaining tank, looking northwest.



Floor removed, monitoring well F620GW004 in left foreground.



Excavating lead-contaminated soil, looking northeast.



West half of excavation; groundwater approx. 4 ft bls.



Acid tank room soil excavation; looking northwest.



Backfilling excavation; looking east.



Finished backfill; looking east.

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

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STL Savannah

[illegible]



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Mr. Herb Kelly
CH2M Hill
3011 SW Williston Road
Gainesville, FL 32608-3928

LOG NO: S1-13258
Received: 25 MAY 01
Reported: 30 MAY 01

Client PO. No.: 2211

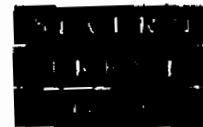
Requisition: 159161.PM.2A

Project: Charleston
Sampled By: Client
Code: 111811127

Page 1

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	DATE/ TIME SAMPLED
13258-1	XPIT8B001	05-24-01/13:00
13258-2	XPIT8B002	05-24-01/14:10
PARAMETER	13258-1	13258-2
Silver (SW6010A), mg/kg dw	<0.94	<1.0
Dilution Factor	1	1
Prep Date	05.25.01	05.25.01
Prep Time	10:00	10:00
Analysis Date	05.29.01	05.29.01
Analysis Time	00:43	00:48
Batch ID	0525A	0525A
Clock ID	1D0529	1D0529
Quantitation Factor	0.94	1.02
Arsenic (SW6010A), mg/kg dw	<0.94	0.95B
Dilution Factor	1	1
Prep Date	05.25.01	05.25.01
Prep Time	10:00	10:00
Analysis Date	05.29.01	05.29.01
Analysis Time	00:43	00:48
Batch ID	0525A	0525A
Clock ID	1D0529	1D0529
Quantitation Factor	0.94	1.02



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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	DATE/ TIME SAMPLED
13258-1	ZPIT8B001	05-24-01/13:00
13258-2	ZPIT8B002	05-24-01/14:10
PARAMETER	13258-1	13258-2
Barium (SW6010A), mg/kg dw	5.8	3.4
Dilution Factor	1	1
Prep Date	05.25.01	05.25.01
Prep Time	10:00	10:00
Analysis Date	05.29.01	05.29.01
Analysis Time	00:43	00:48
Batch ID	0525A	0525A
Clock ID	1D0529	1D0529
Quantitation Factor	0.94	1.02
Cadmium (SW6010A), mg/kg dw	<0.47	<0.51
Dilution Factor	1	1
Prep Date	05.25.01	05.25.01
Prep Time	10:00	10:00
Analysis Date	05.29.01	05.29.01
Analysis Time	00:43	00:48
Batch ID	0525A	0525A
Clock ID	1D0529	1D0529
Quantitation Factor	0.94	1.02



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LOG NO: 81-13258
Received: 25 MAY 01
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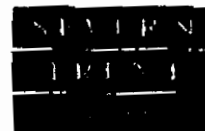
Requisition: 159161.PM.2A

Project: Charleston
Sampled By: Client
Code: 111811127

REPORT OF RESULTS

Page 4

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	DATE/ TIME SAMPLED
13258-1	2PIT8B001	05-24-01/13:00
13258-2	2PIT8B002	05-24-01/14:10
PARAMETER	13258-1	13258-2
Lead (SW6010A), mg/kg dw	2.7	2.1
Dilution Factor	1	1
Prep Date	05.25.01	05.25.01
Prep Time	10:00	10:00
Analysis Date	05.29.01	05.29.01
Analysis Time	00:43	00:48
Batch ID	0525A	0525A
Clock ID	1D0529	1D0529
Quantitation Factor	0.94	1.02
Selenium (SW6010A), mg/kg dw	<0.94	<1.0
Dilution Factor	1	1
Prep Date	05.25.01	05.25.01
Prep Time	10:00	10:00
Analysis Date	05.29.01	05.29.01
Analysis Time	00:43	00:48
Batch ID	0525A	0525A
Clock ID	1D0529	1D0529
Quantitation Factor	0.94	1.02
Percent Solids	97	98



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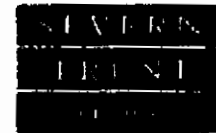
Requisition: 159161.PM.2A

Project: Charleston
Sampled By: Client
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Page 3

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	DATE/ TIME SAMPLED
13258-1	ZPIT8B001	05-24-01/13:00
13258-2	ZPIT8B002	05-24-01/14:10
PARAMETER	13258-1	13258-2
Chromium (SW6010A), mg/kg dw	5.3	2.4
Dilution Factor	1	1
Prep Date	05.25.01	05.25.01
Prep Time	10:00	10:00
Analysis Date	05.29.01	05.29.01
Analysis Time	00:43	00:46
Batch ID	0525A	0525A
Clock ID	1D0529	1D0529
Quantitation Factor	0.94	1.02
Mercury (SW7471A), mg/kg dw	0.17	<0.0051
Dilution Factor	1	1
Prep Date	05.28.01	05.28.01
Prep Time	10:55	10:55
Analysis Date	05.28.01	05.28.01
Analysis Time	17:06	17:09
Batch ID	0528R	0528R
Clock ID	01010528	01010528
Quantitation Factor	1	1



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LOG NO: S1-13258A
Received: 25 MAY 01
Reported: 05 JUN 01

Client PO. No.: 2211

Requisition: 159161.PM.2A

Project: Charleston
Sampled By: Client
Code: 111911127

REPORT OF RESULTS

Page 1

LOG NO	SAMPLE DESCRIPTION, SOLID OR SEMISOLID SAMPLES	DATE/ TIME SAMPLED
13258A-1	ZPIT8B001	05-24-01/13:00
13258A-2	ZPIT8B002	05-24-01/14:10
PARAMETER	13258A-1	13258A-2
TCL Pesticides (SW8081)		
alpha-BHC, ug/kg dw	<1.3	<1.3
beta-BHC, ug/kg dw	<1.3	<1.3
delta-BHC, ug/kg dw	<1.3	<1.3
gamma-BHC (Lindane), ug/kg dw	<1.3	<1.3
Heptachlor, ug/kg dw	<1.3	<1.3
Aldrin, ug/kg dw	<1.3	<1.3
Heptachlor epoxide, ug/kg dw	<1.3	<1.3
Endosulfan I, ug/kg dw	<1.3	<1.3
Dieldrin, ug/kg dw	<2.6	<2.6
4,4'-DDE, ug/kg dw	<2.6	<2.6
Endrin, ug/kg dw	<2.6	<2.6
Endrin aldehyde, ug/kg dw	<2.6	<2.6
Endosulfan II, ug/kg dw	<2.6	<2.6
4,4'-DDD, ug/kg dw	<2.6	<2.6
Endosulfan sulfate, ug/kg dw	<2.6	<2.6
4,4'-DDT, ug/kg dw	<2.6	<2.6
Endrin ketone, ug/kg dw	<2.6	<2.6
Methoxychlor, ug/kg dw	<13	<13
alpha-Chlordane, ug/kg dw	<1.3	<1.3
gamma-Chlordane, ug/kg dw	<1.3	<1.3
Chlordane (technical), ug/kg dw	<13	<13



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Client PO. No.: 2211

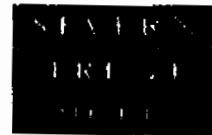
Requisition: 159161.PM.2A

Project: Charleston
Sampled By: Client
Code: 111911127

REPORT OF RESULTS

Page 2

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	DATE/ TIME SAMPLED
13258A-1	ZPIT8B001	05-24-01/13:00
13258A-2	ZPIT8B002	05-24-01/14:10
PARAMETER	13258A-1	13258A-2
Toxaphene, ug/kg dw	<86	<85
Surrogate - DCB	82 %	59 %
Surrogate - 2,4,5,6-Tetrachloro-m-xylene (TCMX)	76 %	58 %
Dilution Factor	1	1
Prep Date	05.29.01	05.29.01
Prep Time	15:20	15:45
Analysis Date	06.04.01	06.04.01
Analysis Time	15:20	15:45
Batch ID	05290	05290
Clock ID	1M0603	1M0603
Quantitation Factor	1	1



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LOG NO: S1-13258A
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Project: Charleston

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Code: 111911127

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	DATE/ TIME SAMPLED
13258A-1	ZPIT8B001	05-24-01/13:00
13258A-2	ZPIT8B002	05-24-01/14:10
PARAMETER	13258A-1	13258A-2
PCB's (8082)		
Aroclor-1016, ug/kg dw	<34	<34
Aroclor-1221, ug/kg dw	<34	<34
Aroclor-1232, ug/kg dw	<34	<34
Aroclor-1242, ug/kg dw	<34	<34
Aroclor-1248, ug/kg dw	<34	<34
Aroclor-1254, ug/kg dw	<69	<68
Aroclor-1260, ug/kg dw	<69	<68
Surrogate - TCX	76 %	58 %
Surrogate - DCB	82 %	59 %
Dilution Factor	1	1
Prep Date	05.29.01	05.29.01
Prep Time	15:20	15:45
Analysis Date	06.04.01	06.04.01
Analysis Time	15:20	15:45
Batch ID	05290	05290
Clock ID	1M0603	1M0603
Quantitation Factor	1	1



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LOG NO: 81-13258A
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Page 4

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION, SOLID OR SEMISOLID SAMPLES	DATE/ TIME SAMPLED
13258A-1	ZPIT8B001	05-24-01/13:00
13258A-2	ZPIT8B002	05-24-01/14:10
PARAMETER	13258A-1	13258A-2
TCL Semivolatiles (8W8270)		
Phenol, ug/kg dw	<340	<340
bis(2-Chloroethyl)ether, ug/kg dw	<340	<340
2-Chlorophenol, ug/kg dw	<340	<340
2-Methylphenol (o-Cresol), ug/kg dw	<340	<340
2,2'-Oxybis(1-Chloropropane)	<340	<340
(bis-2-chloroisopropyl ether), ug/kg dw		
3-Methylphenol/4-Methylphenol (m&p-Cresol), ug/kg dw	<340	<340
1,3-Dichlorobenzene, ug/kg dw	<340	<340
1,4-Dichlorobenzene, ug/kg dw	<340	<340
Benzyl alcohol, ug/kg dw	<340	<340
1,2-Dichlorobenzene, ug/kg dw	<340	<340
N-Nitroso-di-n-propylamine, ug/kg dw	<340	<340
Hexachloroethane, ug/kg dw	<340	<340
1,2,4-Trichlorobenzene, ug/kg dw	<340	<340
Nitrobenzene, ug/kg dw	<340	<340
Isophorone, ug/kg dw	<340	<340
2-Nitrophenol, ug/kg dw	<340	<340
2,4-Dimethylphenol, ug/kg dw	<340	<340
bis(2-Chloroethoxy)methane, ug/kg dw	<340	<340
2,4-Dichlorophenol, ug/kg dw	<340	<340
Naphthalene, ug/kg dw	<340	<340



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LOG NO: 91-13258A
Received: 25 MAY 01
Reported: 05 JUN 01

Mr. Herb Kelly
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3011 SW Williston Road
Gainesville, FL 32608-3928

Client PO. No.: 2211

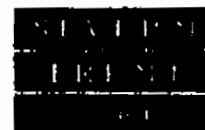
Requisition: 159161.PM.2A

Project: Charleston
Sampled By: Client
Code: 111911127

REPORT OF RESULTS

Page 5

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	DATE/ TIME SAMPLED
13258A-1	ZPIT8B001	05-24-01/13:00
13258A-2	ZPIT8B002	05-24-01/14:10
PARAMETER	13258A-1	13258A-2
Benzoic acid, ug/kg dw	<1800	<1700
4-Chloroaniline, ug/kg dw	<680	<670
Hexachlorobutadiene, ug/kg dw	<340	<340
4-Chloro-3-methylphenol, ug/kg dw	<340	<340
2-Methylnaphthalene, ug/kg dw	<340	<340
Hexachlorocyclopentadiene, ug/kg dw	<340	<340
2,4,6-Trichlorophenol, ug/kg dw	<340	<340
2,4,5-Trichlorophenol, ug/kg dw	<340	<340
2-Chloronaphthalene, ug/kg dw	<340	<340
2-Nitroaniline, ug/kg dw	<1800	<1700
Dimethylphthalate, ug/kg dw	<340	<340
2,6-Dinitrotoluene, ug/kg dw	<340	<340
Acenaphthylene, ug/kg dw	<340	<340
3-Nitroaniline, ug/kg dw	<1800	<1700
Acenaphthene, ug/kg dw	<340	<340
2,4-Dinitrophenol, ug/kg dw	<1800	<1700
4-Nitrophenol, ug/kg dw	<1800	<1700
Dibenzofuran, ug/kg dw	<340	<340
2,4-Dinitrotoluene, ug/kg dw	<340	<340
Diethylphthalate, ug/kg dw	<340	<340
Fluorene, ug/kg dw	<340	<340
Carbazole, ug/kg dw	<340	<340



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Page 6

REPORT OF RESULTS

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13258A-1	ZPIT8B001	05-24-01/13:00
13258A-2	ZPIT8B002	05-24-01/14:10
PARAMETER	13258A-1	13258A-2
4-Chlorophenylphenyl ether, ug/kg dw	<340	<340
4-Nitroaniline, ug/kg dw	<1800	<1700
4,6-Dinitro-2-methylphenol, ug/kg dw	<1800	<1700
N-Nitrosodiphenylamine, ug/kg dw	<340	<340
4-Bromophenylphenyl ether, ug/kg dw	<340	<340
Hexachlorobenzene, ug/kg dw	<340	<340
Pentachlorophenol, ug/kg dw	<1800	<1700
Phenanthrene, ug/kg dw	<340	<340
Anthracene, ug/kg dw	<340	<340
Di-n-butylphthalate, ug/kg dw	<340	<340
Fluoranthene, ug/kg dw	<340	<340
Pyrene, ug/kg dw	<340	<340
Butylbenzylphthalate, ug/kg dw	<340	<340
3,3'-Dichlorobenzidine, ug/kg dw	<680	<670
Benzo(a)anthracene, ug/kg dw	<340	<340
Chrysene, ug/kg dw	<340	<340
bis(2-Ethylhexyl)phthalate, ug/kg dw	<340	<340
Di-n-octylphthalate, ug/kg dw	<340	<340
Benzo(b)fluoranthene, ug/kg dw	<340	<340
Benzo(k)fluoranthene, ug/kg dw	<340	<340
Benzo(a)pyrene, ug/kg dw	<340	<340
Indeno(1,2,3-cd)pyrene, ug/kg dw	<340	<340

Waste Manifests
Wash Basin Area Soil Removal

**OAKRIDGE LANDFILL**

1183 Highway 78, Dorchester, SC 29437
Tel 843-563-2687 Fax 843-563-3378

SPECIAL WASTE MANIFEST**APPROVAL # OR 0104004****EXPIRATION 04/06/2002**

WASTE ID #'S

5101-70 (SanDieo Dession Novel facility)Generator: **FENNEL PROCESSING & TRANSFER**Account Number: **490-148**Location / Address: **141 FENNEL ROAD****N CHARLESTON SC (18)**Tele Number: **843-552-8506**Contact: **JENNIFER CRIM**Generator Signature: Jen / R******* TO BE COMPLETED BY TRANSPORTER *******Transporter of Waste: **FENN - VAC**Truck # 382Date: 3-25-02Driver Signature: T.B.******* TO BE COMPLETED BY OAKRIDGE LANDFILL *******Disposal Site: **Oakridge Landfill DWP 130**Description of Waste: **SLD / NON-REGULATED SLUDGES**Ticket Number: 9179892Tonnage: 1580Received by: McarterDate: 3/25/02

**OAKRIDGE LANDFILL**2183 Highway 78, Dorchester, BC 29437
Tel 843-563-2687 Fax 843-563-3375**SPECIAL WASTE MANIFEST****APPROVAL # OR 0104004****EXPIRATION 04/06/2002**

WASTE ID #'S

501-70 (Sunder Dismal Naval facility)Generator: **FENNEL PROCESSING & TRANSFER**Account Number: **490-148**Location / Address: **141 FENNEL ROAD****N CHARLESTON SC (18)**Tele Number: **843-552-8506**Contact: **JENNIFER CRIM**Generator Signature: *Jennifer Crim*

***** TO BE COMPLETED BY TRANSPORTER *****

Transporter of Waste: **FENN - VAC**

Truck #

382Date: 3-25-02Driver Signature: *[Signature]*

***** TO BE COMPLETED BY OAKRIDGE LANDFILL *****

Disposal Site:

Oakridge Landfill DWP 130

Description of Waste:

SLD / NON-REGULATED SLUDGES

Ticket Number:

9179865

Tonnage:

14.95

Received by:

H. Hince

Date:

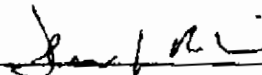
3/25/02

**OAKRIDGE LANDFILL**

2383 Highway 78, Darlington, SC 29437
Tel 843-563-2667 Fax 843-563-3375

SPECIAL WASTE MANIFEST**APPROVAL # OR 0104004****EXPIRATION 04/06/2002**

WASTE ID #S

5101-70 (Southern Dismal Naval facility)Generator: **FENNEL PROCESSING & TRANSFER**Account Number: **490-148**Location / Address: **141 FENNEL ROAD****N CHARLESTON SC (18)**Tele Number: **843-552-8506**Contact: **JENNIFER CRIM**Generator Signature: 

***** TO BE COMPLETED BY TRANSPORTER *****

Transporter of Waste: **FENN - VAC**Truck # 382Date: 3-25-02Driver Signature: 

***** TO BE COMPLETED BY OAKRIDGE LANDFILL *****

Disposal Site: **Oakridge Landfill DWP 130**Description of Waste: **SLD / NON-REGULATED SLUDGES**Ticket Number: 019948Tonnage: 19.02Received by: Date: 3/25/02

UNIFORM HAZARDOUS WASTE MANIFEST		1. Generator's US EPA ID No. 3 C 0 3 7 0 0 2 2 5 6 0		Manifest Document No. 13814	2. Page 1 of 1	Information in the shaded areas is not required by Federal law.	
3. Generator's Name and Mailing Address Southern Div. Naval Facility Engineering Command Caretaker Site Office, P.O. Box 190010 North Charleston, SC 29419-9010							
4. Generator's Phone (800) 437-1963 843-9985 ALA							
5. Transporter 1 Company Name Penn-Vac, Inc.		6. US EPA ID Number 3 C 9 9 0 3 7 5 0 4					
7. Transporter 2 Company Name		8. US EPA ID Number					
9. Designated Facility Name and Site Address Enviroite of Ohio, Inc. 2050 Central Ave. S.E. Canton, OH 44707		10. US EPA ID Number O H D 9 3 0 5 6 8 9 9 2					
11. US DOT Description (Including Proper Shipping Name, Hazard Class and ID Number)				12. Containers		13. Total Quantity	14. Unit Wt/Vol
a. <input checked="" type="checkbox"/> HQ: Hazardous waste, solid, n.o.s. (Contains lead and soil), 9, NA3077, PGIII (D008) <i>EXTRA Pkg</i>				No. Type 0 0 1 C M		15.18	T
b.							
c.							
d.							
15. Special Handling Instructions and Additional Information a) ERG# 171 Emergency Contact (800) 525-5053 InfoFax - Caller Must Identify: Environmental Mgmt. Purchase Order #: 18273							
16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations. If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment. OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.							
Printed/Typed Name <i>ALBERT G. NIEZSIN</i>				Signature <i>Albert G. Niezin</i>		Month Day Year 03 24 92	
17. Transporter 1 Acknowledgement of Receipt of Materials Printed/Typed Name <i>James E. Williams</i>				Signature <i>James E. Williams</i>		Month Day Year 03 24 92	
18. Transporter 2 Acknowledgement of Receipt of Materials Printed/Typed Name <i>TERENCE GARDON</i>				Signature <i>Terence Gardon</i>		Month Day Year 04 07 92	
19. Discrepancy Indication Space <i>Shipment OK</i>							
20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in item 19. Printed/Typed Name <i>JOHN NECKNARD</i>				Signature <i>John Necknard</i>		Month Day Year 04 02 92	

UNIFORM HAZARDOUS WASTE MANIFEST		1. Generator's US EPA ID No. 8 2 0 1 7 0 0 2 2 5 6 0		Manifest Document No. 1 3 8 1 5		2. Page 1 of 1		Information in the shaded areas is not required by Federal law.			
3. Generator's Name and Mailing Address Southern Div. Naval Facility Engineering Command Carataket Site Office, P.O. Box 190010 North Charleston, SC 29419-9010						A. State Manifest Document Number					
4. Generator's Phone (800) 1-1-1-1-1-1-1-1-1-1 (843) 743-9985						B. State Generator ID					
5. Transporter 1 Company Name Penn-Vac, Inc.						C. State Transporter ID					
6. US EPA ID Number 5 C D 9 8 0 0 3 7 5 0 4						D. Transporter ID					
7. Transporter 2 Company Name						E. State Transporter ID					
8. US EPA ID Number						F. Transporter ID					
9. Designated Facility Name and Site Address Envirote of Ohio, Inc. 2050 Central Ave. S.E. Canton, OH 44707						G. State Facility ID					
10. US EPA ID Number O H D 9 8 0 5 6 8 9 9 2						H. Facility ID					
11. US DOT Description (Including Proper Shipping Name, Hazard Class and ID Number)						12. Containers		13. Total Quantity		14. Unit Wt/Vol	
a. <input checked="" type="checkbox"/> RQ, Hazardous waste, solid, n.o.s. (Contains Lead and Soil), 9, NA3077, PGIII (D008)						0 0 1 C M				T	
b.											
c.											
d.											
15. Special Handling Instructions and Additional Information a) ERG#: 171 Emergency Contact (800) 535-3053 Infotrac - Caller Must Identify: Environmental Mgmt. Purchase Order #: 18273											
16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations. If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.											
Printed/Typed Name RICHARD G. NIELSEN						Signature <i>Richard G. Nielsen</i>			Month Day Year 03/26/02		
17. Transporter 1 Acknowledgement of Receipt of Materials											
Printed/Typed Name JESSE E. WILLIAMS						Signature <i>Jesse E. Williams</i>			Month Day Year 03/26/02		
18. Transporter 2 Acknowledgement of Receipt of Materials											
Printed/Typed Name Edward Samuel						Signature <i>Edward Samuel</i>			Month Day Year 03/27/02		
19. Discrepancy Indication Space <div style="text-align: center; font-size: 1.2em;">NO QUANTITY MANIFESTED IN ITEM #13 Rev. 79070p</div>											
20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in item 19.											
Printed/Typed Name JOHN ECKHARDT						Signature <i>John Eckhardt</i>			Month Day Year 03/28/02		

NONHAZARDOUS CERTIFICATION

This is to certify that HAZARDOUS SOLID waste received 3/28/02
from SOUTHERN DIV. NAVAL FACILITY ENGINEERING N. CHARLESTON, SC on manifest
13815 has been rendered nonhazardous in full compliance with the terms of
Envirite Corporation's delisting petition authorization granted by the U.S. EPA on November 6, 1986,
and transferred to Envirite of Ohio, Inc. effective as of January 1, 1997.
CS4409

Having changed this hazardous waste into a nonhazardous material, Envirite of Ohio, Inc. has
eliminated all SOUTHERN DIV. NAVAL FACILITY ENGINEERINGS future hazardous
waste liability for this material under RCRA (Resource Conservation and Recovery Act of 1976).



ENVIRITE
OF OHIO, INC.
CANTON, OHIO 44707

D. Thomas Yablali
President

74240

EX-117

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. SC0170022560 Manifest Document No. 13816

2. Page 1 of 1 Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Southern Div. Naval Facility Engineering Command
Caretaker Site Office, P.O. Box 190010
North Charleston, SC 29419-9010

4. Generator's Phone (800) 407-1903 (843) 743-9985

5. Transporter 1 Company Name
Fenn-Vac, Inc.

6. USEPA ID Number
SCD980837504

7. Transporter 2 Company Name

8. USEPA ID Number

9. Designated Facility Name and Site Address
Envirote of Ohio, Inc.
2050 Central Ave. S.E.
Canton, OH 44707

10. USEPA ID Number
OHD980568992

11. US DOT Description (Including Proper Shipping Name, Hazard Class and ID Number)

a.	RM	Description	12. Containers		13. Total Quantity	14. Unit Wt/Vol
			No.	Type		
a.	X	RQ, Hazardous waste, solid, n.o.s. (Contains Lead and Soil), 9, NA3077, PGIII (D008) 7.6 T.G.	001	CM	13.87	T
b.						
c.						
d.						

15. Special Handling Instructions and Additional Information
a) ERG #: 171
Emergency Contact (800) 535-5053 Infotrac - Caller Must Identify: Environmental Mgmt.
Purchase Order #: 16273

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable International and national government regulations.
If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name Robert L. Spivey Signature Robert L. Spivey Month Day Year 03 26 02

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name TERRANCE GILSON Signature Terrance Gilson Month Day Year 03 27 02

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name _____ Signature _____ Month Day Year _____

19. Discrepancy Indication Space
Shipment OK

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19
Printed/Typed Name JOHN ECKHART Signature John Eckhart Month Day Year 03 28 02

NONHAZARDOUS CERTIFICATION

This is to certify that HAZARDOUS SOLID waste received 3/28/02
from SOUTHERN DIV. NAVAL FACILITY ENGINEERING N. CHARLESTON, SC on manifest
13816 has been rendered nonhazardous according to applicable federal and
state regulations.

CS4409



ENVIRITE
OF OHIO, INC.
CANTON, OHIO 44707

S. Thomas Jablonski
President

FV-89

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved, OMB No. 2050-0038

UNIFORM HAZARDOUS WASTE MANIFEST		1. Generator's US EPA ID No. 3 C D 1 7 0 0 2 2 5 6 0		Manifest Document No. 13817		2. Page 1 of 1		Information in the shaded areas is not required by Federal law.	
3. Generator's Name and Mailing Address Southern U.S. Naval Facility Engineering Command Charleston Site Office, P.O. Box 290010 North Charleston, SC 29419-9010		4. Generator's Phone (803) 437-1985		(843) 743-9995					
5. Transporter 1 Company Name Fenn-Vac, Inc.		6. US EPA ID Number 8 C D 9 8 0 8 3 7 5 0 4							
7. Transporter 2 Company Name		8. US EPA ID Number							
9. Designated Facility Name and Site Address Enterprise of Ohio, Inc. 2050 Central Ave. S.E. Canton, OH 44707		10. US EPA ID Number O H D 9 8 0 5 6 8 9 9 7							
11. US DOT Description (Including Proper Shipping Name, Hazard Class and ID Number)				12. Containers		13. Total Quantity		14. Unit Wt/Vol	
a. <input checked="" type="checkbox"/> RC, Hazardous waste, solid, n.o.s. (Contains Lead and Soil). 9 F 2329, PGIII (D008) 5/15/97 76				No. Type 0 0 1 C M		76 / 11.63			
b.									
c.									
d.									
15. Special Handling Instructions and Additional Information a) ERG: 171 Emergency Contact: (800) 535-5050 Infotrac - Caller Must Identify: Environmental Mgmt. Purchase Order #: 18273									
16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations. If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment. OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.									
Printed/Typed Name Richard G. Nelson				Signature Richard G. Nelson		Month Day Year 11 15 97			
17. Transporter 1 Acknowledgement of Receipt of Materials Printed/Typed Name James Cranwell				Signature James Cranwell		Month Day Year 11 15 97			
18. Transporter 2 Acknowledgement of Receipt of Materials Printed/Typed Name				Signature		Month Day Year			
19. Discrepancy Indication Space Shipment OK									
20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in item 19. Printed/Typed Name Eric Dinkley				Signature Eric Dinkley		Month Day Year 11 15 97			

25911

BUTLER WARE TRUCKING CO.

Customer CH2 m H 11 Date 3-7-02

Job: NGUYEN

Location MT. Pleasant Pit TRINITY Material FL 11

Time Start: _____ Time Stop: _____ Hours Rental: _____

Truck # 15 Truck Type T.H. C.Y. 16 yd.

Driver X [Signature] Load Count _____

Signature X [Signature]

05/14/02 10:20 FAX

003

ENVIRTE OF OHIO, INC.
CANTON, OHIO 44707

WEIGHT TALLY

NUMBER _____

REMARKS: _____

SOUTHERN NAVAL

CS4409

FENN VAW NO. 2

NO. 2

78240 lb 07:45 am 03/28/02

78240 lb Gross

29020 lb Net

49220 lb Tare

08:36 am 03/28/02

☐ LPU

☐ SPU

ENVIRTE OF OHIO, INC., WEIGHER

BRECHBUHLER SCALES

Waste Manifests
Acid Tank Room Soil Removal



OAKRIDGE LANDFILL

2183 Highway 78, Dorchester, SC 29437
Tel 843-563-2607, Fax 843-563-3375SPECIAL WASTE MANIFEST
APPROVAL # OR 0211026
EXPIRATION 11/26/03

Generator: CH2MHILL/JONES,LLC

Account Number: 490-291

Location / Address: 1849 AVE F

N CHARLESTON SC (10)

Telephone Number: 843-740-2780

CONTACT: BOB CARROLL

Generator Signature: 

***** TO BE COMPLETED BY TRANSPORTER *****


Transporter of Waste: MURRAY SAND

TRUCK # 64Date: 12/02/12DRIVERS SIGNATURE: 

***** TO BE COMPLETED BY OAKRIDGE LANDFILL *****

Disposal Site: Oakridge Landfill DWP 130

Description of Waste: SOL/LEAD CONTAMINATED SOIL

Ticket Number: 201208Tonnage: 22.76Received by: Date: 12-2-02



OAKRIDGE LANDFILL

2183 Highway 78, Dorchester, SC 29437
Tel 843-563-2607, Fax 843-563-3375SPECIAL WASTE MANIFEST
APPROVAL # OR 0211026
EXPIRATION 11/26/03

Generator: CH2MHILL/JONES,LLC

Account Number: 490-291

Location / Address: 1849 AVE F

N CHARLESTON SC (10)

Telephone Number: 843-740-2780

CONTACT: BOB CARROLL

Generator Signature: [Signature]

***** TO BE COMPLETED BY TRANSPORTER *****

Transporter of Waste: MURRAY SAND

TRUCK # 72Date: 12/22/02DRIVERS SIGNATURE: [Signature]

***** TO BE COMPLETED BY OAKRIDGE LANDFILL *****

Disposal Site: Oakridge Landfill-DWP 130

Description of Waste: SOL/LEAD CONTAMINATED SOIL

Ticket Number: 209488Tonnage: 17.07Received by: [Signature]Date: 12-2-02



OAKRIDGE LANDFILL

2183 Highway 78, Dorchester, SC 29437
Tel 843-563-2607, Fax 843-563-3375SPECIAL WASTE MANIFEST
APPROVAL # OR 0211026
EXPIRATION 11/26/03

Generator: CH2MHILL/JONES,LLC

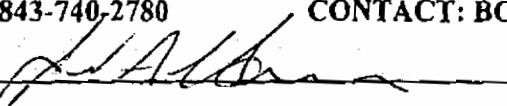
Account Number: 490-291

Location / Address: 1849 AVE F

N CHARLESTON SC (10)

Telephone Number: 843-740-2780

CONTACT: BOB CARROLL

Generator Signature: 

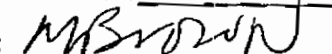
***** TO BE COMPLETED BY TRANSPORTER *****

Transporter of Waste: MURRAY SAND

TRUCK # 83

Date: 12/12/02

DRIVERS SIGNATURE:



***** TO BE COMPLETED BY OAKRIDGE LANDFILL *****

Disposal Site: Oakridge Landfill DWP 130

Description of Waste: SOL/LEAD CONTAMINATED SOIL

Ticket Number:

209207

Tonnage:

17.60

Received by:



Date:

12-2-02

**OAKRIDGE LANDFILL**2183 Highway 78, Dorchester, SC 29437
Tel 843-563-2607, Fax 843-563-3375**SPECIAL WASTE MANIFEST
APPROVAL # OR 0211026
EXPIRATION 11/26/03**

Generator: CH2MHILL/JONES,LLC

Account Number: 490-291

Location / Address: 1849 AVE F

N CHARLESTON SC (10)

Telephone Number: 843-740-2780

CONTACT: BOB CARROLL

Generator Signature:

***** TO BE COMPLETED BY TRANSPORTER *****

Transporter of Waste: MURRAY SAND

TRUCK # 65

Date: 12/02/02

DRIVERS SIGNATURE

***** TO BE COMPLETED BY OAKRIDGE LANDFILL *****

Disposal Site: Oakridge Landfill DWP 130

Description of Waste: SOL/LEAD CONTAMINATED SOIL

Ticket Number: 209225

Tonnage: 18.79

Received by:

Date: 12-2-02



OAKRIDGE LANDFILL
2183 Highway 78, Dorchester, SC 29437
Tel 843-563-2607, Fax 843-563-3375

SPECIAL WASTE MANIFEST
APPROVAL # OR 0211026
EXPIRATION 11/26/03

Generator: CH2MHILL/JONES,LLC

Account Number: 490-291

Location / Address: 1849 AVE F N CHARLESTON SC (10)

Telephone Number: 843-740-2780 CONTACT: BOB CARROLL

Generator Signature: [Signature]

***** TO BE COMPLETED BY TRANSPORTER *****

Transporter of Waste: MURRAY SAND TRUCK # 108

Date: 12/02/02 DRIVERS SIGNATURE: [Signature]

***** TO BE COMPLETED BY OAKRIDGE LANDFILL *****

Disposal Site: Oakridge Landfill DWP 130

Description of Waste: SOL/LEAD CONTAMINATED SOIL

Ticket Number: 204222 20484 Tonnage: 14.39

Received by: [Signature]

Date: 12-2-02

**OAKRIDGE LANDFILL**2183 Highway 78, Dorchester, SC 29437
Tel 843-563-2607, Fax 843-563-3375**SPECIAL WASTE MANIFEST
APPROVAL # OR 0211026
EXPIRATION 11/26/03**

Generator: CH2MHILL/JONES,LLC

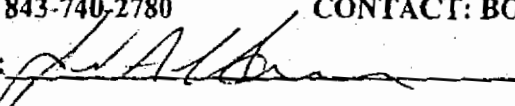
Account Number: 490-291

Location / Address: 1849 AVE F

N CHARLESTON SC (10)

Telephone Number: 843-740-2780

CONTACT: BOB CARROLL


Generator Signature: 

***** TO BE COMPLETED BY TRANSPORTER *****

Transporter of Waste: MURRAY SAND

TRUCK # 62

Date: 12/02/02

DRIVERS SIGNATURE: 

***** TO BE COMPLETED BY OAKRIDGE LANDFILL *****

Disposal Site:

Oakridge Landfill DWP 130

Description of Waste: SOL/LEAD CONTAMINATED SOIL

Ticket Number: 200029

Tonnage: 20.12

Received by: 

Date: 12-2-02

TOTAL P.02

007



OAKRIDGE LANDFILL

2183 Highway 78, Dorchester, SC 29437
Tel 843-563-2607, Fax 843-563-3375

**SPECIAL WASTE MANIFEST
APPROVAL # OR 0211026
EXPIRATION 11/26/03**

Generator: CH2MHILL/JONES,LLC

Account Number: 490-291

Location / Address: 1849 AVE F

N CHARLESTON SC (10)

Telephone Number: 843-740-2780

CONTACT: BOB CARROLL

Generator Signature: [Signature]

***** TO BE COMPLETED BY TRANSPORTER *****

Transporter of Waste: MURRAY SAND

TRUCK # 83

Date: 12/2/02

DRIVERS SIGNATURE: [Signature]

***** TO BE COMPLETED BY OAKRIDGE LANDFILL *****

Disposal Site: Oakridge Landfill DWP 130

Description of Waste: SOIL/LEAD CONTAMINATED SOIL

Ticket Number: 000005

Tonnage: 22.76

Received by: [Signature]

Date: 12/2/02



OAKRIDGE LANDFILL

2183 Highway 78, Dorchester, SC 29437
Tel 843-563-2607, Fax 843-563-3375

SPECIAL WASTE MANIFEST
APPROVAL # OR 0211026
EXPIRATION 11/26/03

Generator: CH2MHILL/JONES,LLC

Account Number: 490-291

Location / Address: 1849 AVE F

N CHARLESTON SC (10)

Telephone Number: 843-740-2780

CONTACT: BOB CARROLL

Generator Signature: [Signature]

***** TO BE COMPLETED BY TRANSPORTER *****

Transporter of Waste: MURRAY SAND

TRUCK #

65

Date: 12/2/02

DRIVERS SIGNATURE

[Signature]

***** TO BE COMPLETED BY OAKRIDGE LANDFILL *****

Disposal Site: Oakridge Landfill DWP 130

Description of Waste: SOIL/LEAD CONTAMINATED SOIL

Ticket Number: 00210Tonnage: 22.21Received by: MasterDate: 12/2/02



OAKRIDGE LANDFILL

2183 Highway 78, Dorchester, SC 29437
Tel 843-563-2607, Fax 843-563-3375

SPECIAL WASTE MANIFEST
APPROVAL # OR 0211026
EXPIRATION 11/26/03

Generator: CH2MHILL/JONES,LLC

Account Number: 490-291

Location / Address: 1849 AVE F

N CHARLESTON SC (10)

Telephone Number: 843-740-2780

CONTACT: BOB CARROLL

Generator Signature: [Signature]

***** TO BE COMPLETED BY TRANSPORTER *****

Transporter of Waste: MURRAY SAND

TRUCK #

62

Date: 12/2/02

DRIVERS SIGNATURE: [Signature]

***** TO BE COMPLETED BY OAKRIDGE LANDFILL *****

Disposal Site: Oakridge Landfill DWP 130

Description of Waste: SOLID LEAD CONTAMINATED SOIL

Ticket Number: 20078Tonnage: 00.31Received by: [Signature]Date: 12/2/02

**OAKRIDGE LANDFILL**2183 Highway 78, Dorchester, SC 29437
Tel 843-563-2607, Fax 843-563-3375**SPECIAL WASTE MANIFEST
APPROVAL # OR 0211026
EXPIRATION 11/26/03**

Generator: CH2MHILL/JONES,LLC

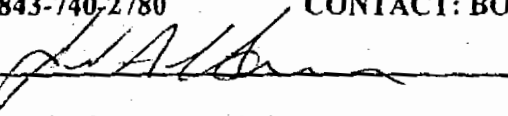
Account Number: 490-291

Location / Address: 1849 AVE F

N CHARLESTON SC (10)

Telephone Number: 843-740-2780

CONTACT: BOB CARROLL

Generator Signature: 

***** TO BE COMPLETED BY TRANSPORTER *****

Transporter of Waste: MURRAY SAND TRUCK # 72

Date: 12/2/02 DRIVERS SIGNATURE: 

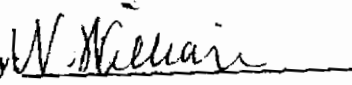
***** TO BE COMPLETED BY OAKRIDGE LANDFILL *****

Disposal Site: Oakridge Landfill DWP 130

Description of Waste: SOL/LEAD CONTAMINATED SOIL

Ticket Number: 209292

Tonnage: 21.11

Received by: 

Date: 12-2-02



OAKRIDGE LANDFILL

2183 Highway 78, Dorchester, SC 29437
Tel 843-563-2607, Fax 843-563-3375SPECIAL WASTE MANIFEST
APPROVAL # OR 0211026
EXPIRATION 11/26/03

Generator: CH2MHILL/JONES,LLC

Account Number: 490-291

Location / Address: 1849 AVE F

N CHARLESTON SC (10)

Telephone Number: 843-740-2780

CONTACT: BOB CARROLL

Generator Signature: 

***** TO BE COMPLETED BY TRANSPORTER *****

Transporter of Waste: MURRAY SAND

TRUCK # 83Date: 12/2/02DRIVERS SIGNATURE: MBROWN

***** TO BE COMPLETED BY OAKRIDGE LANDFILL *****

Disposal Site: Oakridge Landfill DWP 130

Description of Waste: SOL/LEAD CONTAMINATED SOIL

Ticket Number: 209322Tonnage: 20.89Received by: W. WilliamsDate: 12-2-02



OAKRIDGE LANDFILL
2183 Highway 78, Dorchester, SC 29437
Tel 843-563-2607, Fax 843-563-3375

SPECIAL WASTE MANIFEST
APPROVAL # OR 0211026
EXPIRATION 11/26/03

Generator: CH2MHILL/JONES,LLC

Account Number: 490-291

Location / Address: 1849 AVE F N CHARLESTON SC (19)

Telephone Number: 843-740-2780 CONTACT: BOB CARROLL

Generator Signature: [Signature]

***** TO BE COMPLETED BY TRANSPORTER *****

Transporter of Waste: MURRAY SAND TRUCK # 05

Date: 12/2/02 DRIVERS SIGNATURE [Signature]

***** TO BE COMPLETED BY OAKRIDGE LANDFILL *****

Disposal Site: Oakridge Landfill DWP 130

Description of Waste: SOL/LEAD CONTAMINATED SOIL

Ticket Number: 209323 Tonnage: 19.17

Received by: [Signature] Date: 12-2-02

TOTAL P.02

013



OAKRIDGE LANDFILL
2183 Highway 78, Dorchester, SC 29437
Tel 843-563-2607, Fax 843-563-3375

SPECIAL WASTE MANIFEST
APPROVAL # OR 0211026
EXPIRATION 11/26/03

Generator: CH2MHILL/JONES,LLC

Account Number: 490-291

Location / Address: 1849 AVE F

N CHARLESTON SC (10)

Telephone Number: 843-740-2780

CONTACT: BOB CARROLL

Generator Signature: [Signature]

***** TO BE COMPLETED BY TRANSPORTER *****

Transporter of Waste: MURRAY SAND

TRUCK # 62

Date: 12/2/02

DRIVERS SIGNATURE: [Signature]

***** TO BE COMPLETED BY OAKRIDGE LANDFILL *****

Disposal Site: Oakridge Landfill DWP 130

Description of Waste: SOL/LEAD CONTAMINATED SOIL

Ticket Number: 209325

Tonnage: 17.67

Received by: W. Williams

Date: 12-2-02

TOTAL P.02

014



OAKRIDGE LANDFILL
2183 Highway 78, Dorchester, SC 29437
Tel 843-563-2607, Fax 843-563-3375

**SPECIAL WASTE MANIFEST
APPROVAL # OR 0211026
EXPIRATION 11/26/03**

Generator: CH2MHILL/JONES,LLC

Account Number: 490-291

Location / Address: 1849 AVE F

N CHARLESTON SC (10)

Telephone Number: 843-740-2780

CONTACT: BOB CARROLL

Generator Signature: [Signature]

***** TO BE COMPLETED BY TRANSPORTER *****

Transporter of Waste: MURRAY SAND

TRUCK # 72

Date: 12/2/02

DRIVERS SIGNATURE: [Signature]

***** TO BE COMPLETED BY OAKRIDGE LANDFILL *****

Disposal Site:

Oakridge Landfill DWP 130

Description of Waste: SOL/LEAD CONTAMINATED SOIL

Ticket Number: 209328

Tonnage: 22.67

Received by: W. Williams

Date: 12-2-02



OAKRIDGE LANDFILL
2183 Highway 78, Dorchester, SC 29437
Tel 843-563-2607, Fax 843-563-3375

SPECIAL WASTE MANIFEST
APPROVAL # OR 0211026
EXPIRATION 11/26/03

Generator: CH2MHILL/JONES,LLC

Account Number: 490-291

Location / Address: 1849 AVE F N CHARLESTON SC (10)

Telephone Number: 843-740-2780 CONTACT: BOB CARROLL

Generator Signature: [Signature]

***** TO BE COMPLETED BY TRANSPORTER *****

Transporter of Waste: MURRAY SAND TRUCK # 677 # 1

Date: 12/3/02 DRIVERS SIGNATURE: [Signature]

***** TO BE COMPLETED BY OAKRIDGE LANDFILL *****

Disposal Site: Oakridge Landfill DWP 130

Description of Waste: SOL/LEAD CONTAMINATED SOIL

Ticket Number: 209384 440 Tonnage: 23.48

Received by: [Signature] Date: 12.3.02

**OAKRIDGE LANDFILL**2183 Highway 78, Dorchester, SC 29437
Tel 843-563-2607, Fax 843-563-3375**SPECIAL WASTE MANIFEST
APPROVAL # OR 0211026
EXPIRATION 11/26/03**

Generator: CH2MHILL/JONES,LLC

Account Number: 490-291

Location / Address: 1849 AVE F

N CHARLESTON SC (10)

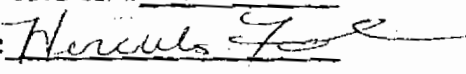
Telephone Number: 843-740-2780

CONTACT: BOB CARROLL

Generator Signature: 

***** TO BE COMPLETED BY TRANSPORTER *****

Transporter of Waste: MURRAY SAND

TRUCK # 162Date: 12/3/02DRIVERS SIGNATURE: 

***** TO BE COMPLETED BY OAKRIDGE LANDFILL *****

Disposal Site: Oakridge Landfill DWP 130

Description of Waste: SOL/LEAD CONTAMINATED SOIL

Ticket Number: 000386Tonnage: 24.73Received by: Y. CarterDate: 12/3/02

TOTAL P.02

017



OAKRIDGE LANDFILL

2183 Highway 78, Dorchester, SC 29437
Tel 843-563-2607, Fax 843-563-3375

**SPECIAL WASTE MANIFEST
APPROVAL # OR 0211026
EXPIRATION 11/26/03**

Generator: CH2MHILL/JONES,LLC

Account Number: 490-291

Location / Address: 1849 AVE F

N CHARLESTON SC (10)

Telephone Number: 843-740-2780

CONTACT: BOB CARROLL

Generator Signature: [Signature]

***** TO BE COMPLETED BY TRANSPORTER *****

Transporter of Waste: MURRAY SAND

TRUCK # 183

Date: 12/3/02

DRIVERS SIGNATURE: [Signature]

***** TO BE COMPLETED BY OAKRIDGE LANDFILL *****

Disposal Site: Oakridge Landfill DWP 130

Description of Waste: SOIL/LEAD CONTAMINATED SOIL

Ticket Number: 009388

Tonnage: 26.25

Received by: Y Carter

Date: 12/3/02



OAKRIDGE LANDFILL
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Tel 843-563-2607, Fax 843-563-3375

SPECIAL WASTE MANIFEST
APPROVAL # OR 0211026
EXPIRATION 11/26/03

Generator: CH2MHILL/JONES,LLC

Account Number: 490-291

Location / Address: 1849 AVE F

N CHARLESTON SC (10)

Telephone Number: 843-740-2780

CONTACT: BOB CARROLL

Generator Signature: [Signature]

***** TO BE COMPLETED BY TRANSPORTER *****

Transporter of Waste: MURRAY SAND

TRUCK # 03

Date: 12/3/02

DRIVERS SIGNATURE: [Signature]

***** TO BE COMPLETED BY OAKRIDGE LANDFILL *****

Disposal Site: Oakridge Landfill DWP 130

Description of Waste: SOL/LEAD CONTAMINATED SOIL

Ticket Number: 209422

Tonnage: 21.60 ✓

Received by: [Signature]

Date: 12-3-02



OAKRIDGE LANDFILL

2183 Highway 78, Dorchester, SC 29437
Tel 843-563-2607, Fax 843-563-3375SPECIAL WASTE MANIFEST
APPROVAL # OR 0211026
EXPIRATION 11/26/03

Generator: CH2MHILL/JONES,LLC

Account Number: 490-291

Location / Address: 1849 AVE F

N CHARLESTON SC (10)

Telephone Number: 843-740-2780

CONTACT: BOB CARROLL

Generator Signature: [Signature]

***** TO BE COMPLETED BY TRANSPORTER *****

Transporter of Waste: MURRAY SAND

TRUCK # # 1Date: 12/3/02DRIVERS SIGNATURE: [Signature]

***** TO BE COMPLETED BY OAKRIDGE LANDFILL *****

Disposal Site: Oakridge Landfill DWP 130

Description of Waste: SOLID LEAD CONTAMINATED SOIL

Ticket Number: 209397Tonnage: 21.19Received by: [Signature]Date: 12/3/02

✓

**OAKRIDGE LANDFILL**2183 Highway 78, Dorchester, SC 29437
Tel 843-563-2607, Fax 843-563-3375**SPECIAL WASTE MANIFEST
APPROVAL # OR 0211026
EXPIRATION 11/26/03**

Generator: CH2MHILL/JONES,LLC

Account Number: 490-291

Location / Address: 1849 AVE F

N CHARLESTON SC (10)

Telephone Number: 843-740-2780

CONTACT: BOB CARROLL

Generator Signature: [Signature]

***** TO BE COMPLETED BY TRANSPORTER *****

Transporter of Waste: MURRAY SAND

TRUCK # 169Date: 12/3/02DRIVERS SIGNATURE: [Signature]

***** TO BE COMPLETED BY OAKRIDGE LANDFILL *****

Disposal Site: Oakridge Landfill DWP 130

Description of Waste: SOL/LEAD CONTAMINATED SOIL

Ticket Number: 209406Tonnage: 216.00Received by: [Signature]Date: 12/3/02

TOTAL P.02

021



OAKRIDGE LANDFILL
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Tel 843-563-2607, Fax 843-563-3375

SPECIAL WASTE MANIFEST
APPROVAL # OR 0211026
EXPIRATION 11/26/03

Generator: CH2MHILL/JONES,LLC

Account Number: 490-291

Location / Address: 1849 AVE F

N CHARLESTON SC (10)

Telephone Number: 843-740-2780

CONTACT: BOB CARROLL

Generator Signature: [Signature]

***** TO BE COMPLETED BY TRANSPORTER *****

Transporter of Waste: MURRAY SAND

TRUCK # 65

Date: 12/3/02

DRIVERS SIGNATURE: [Signature]

***** TO BE COMPLETED BY OAKRIDGE LANDFILL *****

Disposal Site: Oakridge Landfill DWP 130

Description of Waste: SOL/LEAD CONTAMINATED SOIL

Ticket Number: 209411

Tonnage: 23.42

Received by: [Signature]

Date: 12-3-02

**OAKRIDGE LANDFILL**2183 Highway 78, Dorchester, SC 29437
Tel 843-563-2607, Fax 843-563-3375**SPECIAL WASTE MANIFEST
APPROVAL # OR 0211026
EXPIRATION 11/26/03**

Generator: CH2MHILL/JONES,LLC

Account Number: 490-291

Location / Address: 1849 AVE F

N CHARLESTON SC (10)

Telephone Number: 843-740-2780

CONTACT: BOB CARROLL

Generator Signature: 

***** TO BE COMPLETED BY TRANSPORTER *****

Transporter of Waste: MURRAY SAND

TRUCK #

62

Date: 12/3/02

DRIVERS SIGNATURE: 

***** TO BE COMPLETED BY OAKRIDGE LANDFILL *****

Disposal Site: Oakridge Landfill DWP 130

Description of Waste: SOL/LEAD CONTAMINATED SOIL

Ticket Number: 209423

Tonnage:

26.39

Received by: 

Date:

12-3-02



OAKRIDGE LANDFILL

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SPECIAL WASTE MANIFEST
APPROVAL # OR 0211026
EXPIRATION 11/26/03

Generator: CH2MHILL/JONES,LLC

Account Number: 490-291

Location / Address: 1849 AVE F

N CHARLESTON SC (10)

Telephone Number: 843-740-2780

CONTACT: BOB CARROLL

Generator Signature: [Signature]

***** TO BE COMPLETED BY TRANSPORTER *****

Transporter of Waste: MURRAY SAND

TRUCK # 1Date: 12/3/02DRIVERS SIGNATURE: Gres Holmes

***** TO BE COMPLETED BY OAKRIDGE LANDFILL *****

Disposal Site:

Oakridge Landfill DWP 130

Description of Waste: SOL/LEAD CONTAMINATED SOIL

Ticket Number: 50057Tonnage: 29.79Received by: UNDate: 12/3/02

TOTAL P.02

024



OAKRIDGE LANDFILL
2133 Highway 78, Dorchester, SC 29437
Tel 843-563-2607, Fax 843-563-3375

SPECIAL WASTE MANIFEST
APPROVAL # OR 0211026
EXPIRATION 11/26/03

Generator: CH2MHILL/JONES,LLC

Account Number: 490-291

Location / Address: 1849 AVE F

N CHARLESTON SC (10)

Telephone Number: 843-740-2780

CONTACT: BOB CARROLL

Generator Signature: [Signature]

***** TO BE COMPLETED BY TRANSPORTER *****

Transporter of Waste: MURRAY SAND

TRUCK # 162

Date: 12/3/02

DRIVERS SIGNATURE: [Signature]

***** TO BE COMPLETED BY OAKRIDGE LANDFILL *****

Disposal Site: Oakridge Landfill DWP 130

Description of Waste: SOL/LEAD CONTAMINATED SOIL

Ticket Number: 209456

Tonnage: 28.75

Received by: [Signature]

Date: 12.3.02

✓



OAKRIDGE LANDFILL

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Tel 843-563-2607, Fax 843-563-3375SPECIAL WASTE MANIFEST
APPROVAL # OR 0211026
EXPIRATION 11/26/03

Generator: CH2MHILL/JONES,LLC

Account Number: 490-291

Location / Address: 1849 AVE F

N CHARLESTON SC (10)

Telephone Number: 843-740-2780

CONTACT: BOB CARROLL

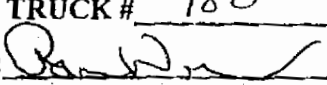
Generator Signature: 

***** TO BE COMPLETED BY TRANSPORTER *****

Transporter of Waste: MURRAY SAND

TRUCK # 180

Date: 12/3/02

DRIVERS SIGNATURE: 

***** TO BE COMPLETED BY OAKRIDGE LANDFILL *****

Disposal Site: Oakridge Landfill DWP 130

Description of Waste: SOL/LEAD CONTAMINATED SOIL

Ticket Number: 209454

Tonnage: 21.05 ✓

Received by: 

Date: 12.3.02

TOTAL P.02

026



OAKRIDGE LANDFILL

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**SPECIAL WASTE MANIFEST
APPROVAL # OR 0211026
EXPIRATION 11/26/03**

Generator: CH2MHILL/JONES,LLC

Account Number: 490-291

Location / Address: 1849 AVE F

N CHARLESTON SC (10)

Telephone Number: 843-740-2780

CONTACT: BOB CARROLL

Generator Signature: [Signature]

***** TO BE COMPLETED BY TRANSPORTER *****

Transporter of Waste: MURRAY SAND

TRUCK # 2

Date: 12/3/02

DRIVERS SIGNATURE: [Signature]

***** TO BE COMPLETED BY OAKRIDGE LANDFILL *****

Disposal Site: Oakridge Landfill DWP 130

Description of Waste: SOL/LEAD CONTAMINATED SOIL

Ticket Number: 209462

Tonnage: 19.36

Received by: [Signature]

Date: 12.3.02

✓



OAKRIDGE LANDFILL
2183 Highway 78, Dorchester, SC 29437
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SPECIAL WASTE MANIFEST
APPROVAL # OR 0211026
EXPIRATION 11/26/03

Generator: CH2MHILL/JONES,LLC

Account Number: 490-291

Location / Address: 1849 AVE F

N CHARLESTON SC (10)

Telephone Number: 843-740-2780

CONTACT: BOB CARROLL

Generator Signature: [Signature]

***** TO BE COMPLETED BY TRANSPORTER *****

Transporter of Waste: MURRAY SAND

TRUCK # 169

Date: 12/3/02

DRIVERS SIGNATURE: [Signature]

***** TO BE COMPLETED BY OAKRIDGE LANDFILL *****

Disposal Site: Oakridge Landfill DWP 130

Description of Waste: SOL/LEAD CONTAMINATED SOIL

Ticket Number: 209472

Tonnage: 22.70

Received by: [Signature]

Date: 12.3.02



OAKRIDGE LANDFILL

2183 Highway 78, Dorchester, SC 29437
Tel 843-563-2607, Fax 843-563-3375SPECIAL WASTE MANIFEST
APPROVAL # OR 0211026
EXPIRATION 11/26/03

Generator: CH2MHILL/JONES,LLC

Account Number: 490-291

Location / Address: 1849 AVE F

N CHARLESTON SC (10)

Telephone Number: 843-740-2780

CONTACT: BOB CARROLL

Generator Signature: 

***** TO BE COMPLETED BY TRANSPORTER *****

Transporter of Waste: MURRAY SAND

TRUCK # 65Date: 12/3/02DRIVERS SIGNATURE: 

***** TO BE COMPLETED BY OAKRIDGE LANDFILL *****

Disposal Site: Oakridge Landfill DWP 130

Description of Waste: SOL/LEAD CONTAMINATED SOIL

Ticket Number: 000560Tonnage: 24.32Received by: UNCAsterDate: 12/3/02



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SPECIAL WASTE MANIFEST
APPROVAL # OR 0211026
EXPIRATION 11/26/03

Generator: CH2MHILL/JONES,LLC

Account Number: 490-291

Location / Address: 1849 AVE F

N CHARLESTON SC (10)

Telephone Number: 843-740-2780

CONTACT: BOB CARROLL

Generator Signature: [Signature]

***** TO BE COMPLETED BY TRANSPORTER *****

Transporter of Waste: MURRAY SAND

TRUCK # 14

Date: 12/8/02

DRIVERS SIGNATURE: [Signature]

***** TO BE COMPLETED BY OAKRIDGE LANDFILL *****

Disposal Site: Oakridge Landfill DWP 130

Description of Waste: SOL/LEAD CONTAMINATED SOIL

Ticket Number: 200712

Tonnage: 1.07

Received by: [Signature]

Date: 12/8/02
12/4/02